

OS/2[®]

M A G A Z I N E

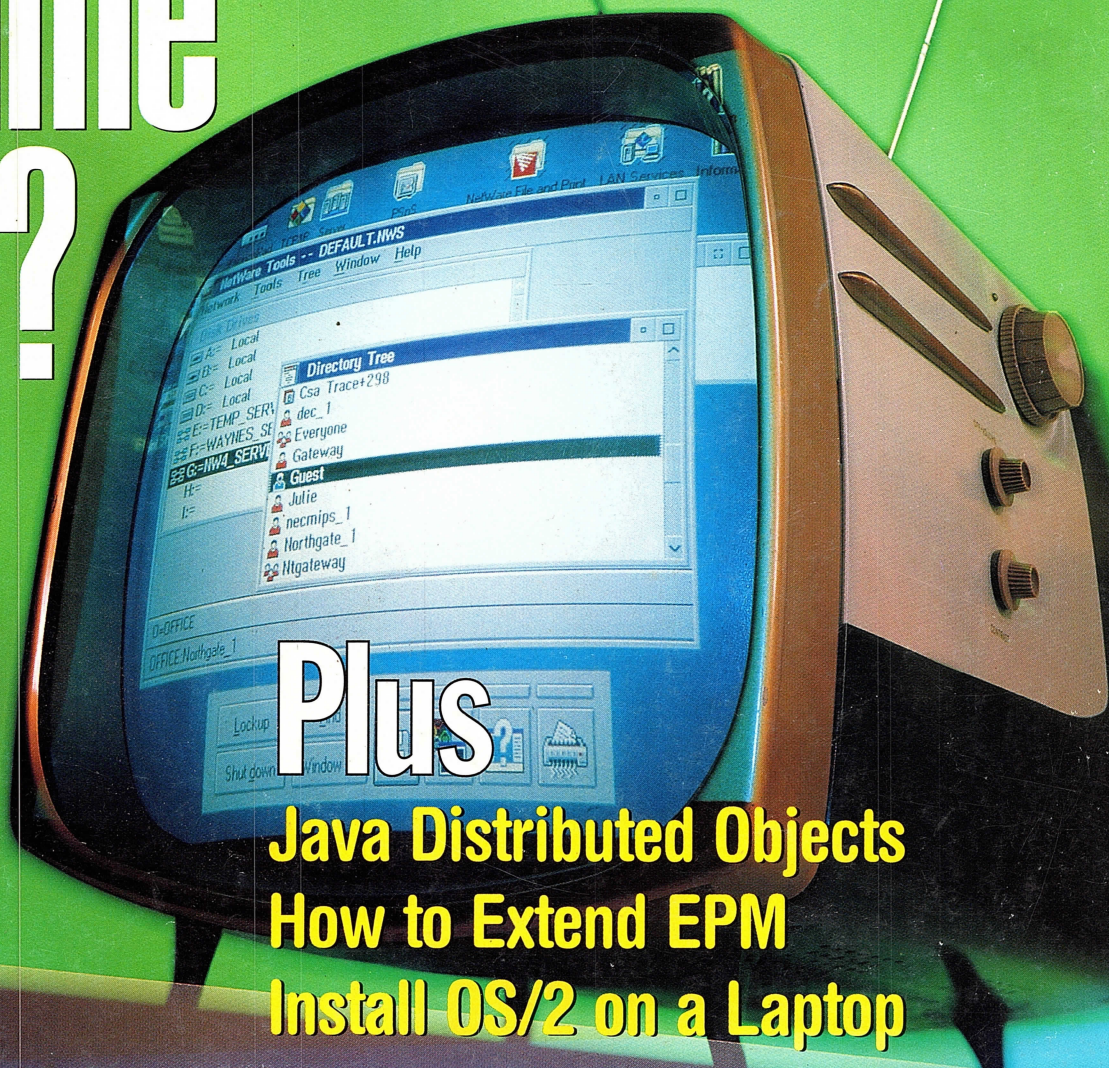
Reviews

Columbia Encyclopedia
File Manager/2 2.40a
Xit 2.1, Guidelines 3.3
FontFolder 2.0
Surf'nRexx

Ready for Prime Time?

OS/2 Warp
Server

Page 24



Plus

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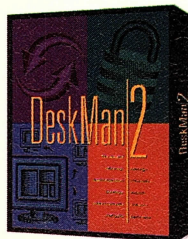
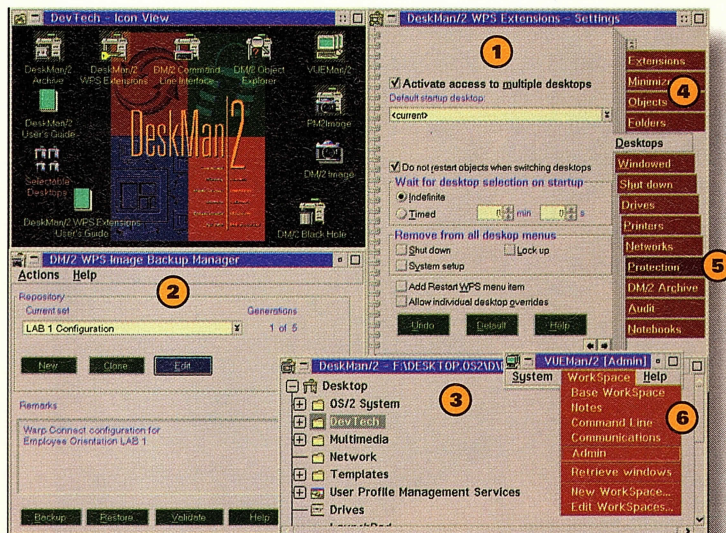
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Editor-in-Chief

Alan Zeichick
zeichick@acm.org

Senior Managing Editor

Theresa Mori
tmori@mfi.com

Associate Editor

Alexander Antoniadis
sander@mfi.com

Editorial Assistant

Amy Wu
awu@mfi.com

Editor-at-Large

Dick Conklin
os2mag@vnet.ibm.com

Art Director

David Bergeron
dbergeron@mfi.com

Senior Contributing Editors

Brian Proffit
75300.1466@compuserve.com
Esther Schindler
esther@primenet.com

Contributing Editors

Mark Benge
banzai@raleigh.ibm.com
Dick Goran
dgoran@cfsrexx.com
Stan Kelly-Bootle
skb@crl.com
David Moskowitz
76701.100@compuserve.com
Wayne Rash, Jr.
wrash@interamp.com
David Reich
speedracer@bocaraton.ibm.com
Guy Scharf
guy@swarc.com
Roger Sessions
roger@fc.net
Matt Smith
msmith@prominare.com

Publisher

Peter Westerman (415) 905-2392
pwesterman@mfi.com

National Sales Manager

Catherine McConville (415) 905-8115
cmconville@mfi.com

Western Sales Assistant

Jana Outlaw (415) 905-3367
joutlaw@mfi.com

East/Midwest Sales Manager

Gary Ciocci (603) 924-9141
gciocci@mfi.com

Eastern Sales

Gordon Peery (603) 924-9141
gpeery@mfi.com

Advertising Production Coordinator

Glenn Sadin

Marketing Manager

Susan McDonald

Marketing Graphic Designer

Azriel Hayes

Group Circulation Director

John Rockwell

Group Circulation Manager

Lucinda Formyduval

Circulation Manager

Stephanie Blake

Assistant Circulation Manager

Mark Johnson

Newsstand Manager

Deborah Caris



Reprints

Stella Valdez (916) 729-3633
svaldez@mfi.com

Chairman/CEO

Marshall W. Freeman

President/COO

Thomas L. Kemp

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Warren "Andy" Ambrose

Senior Vice Presidents

David Nussbaum, Darrell Denny,
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VP/Software Development Division

Regina Starr Ridley



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Editorial Offices

Our editorial offices are located at:

OS/2 Magazine
Editorial Department
600 Harrison St.
San Francisco, CA 94107
fax (415) 905-2499
os2mag@mfi.com

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You can send e-mail to our editors' and contributing editors' standard Internet addresses. Many can also be reached using their CompuServe accounts:

Alexander Antoniadis	71154,676
Mark Benge	73532,2063
Dick Conklin	76711,1005
Dick Goran	71154,2002
Stan Kelly-Bootle	70323,1560
David Moskowitz	76701,100
Brian Proffit	75300,1466
Wayne Rash, Jr.	72205,221
David Reich	76711,632
Guy Scharf	76702,557
Esther Schindler	72241,1417
Matt Smith	70363,1175
Alan Zeichick	76703,756

World Wide Web

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We also maintain a Web-accessible database of OS/2-related products, the Software Solutions Buyer's Guide. You can jump to it from our main home page or link to it directly at <http://www.mfi.com/softwareguide>.

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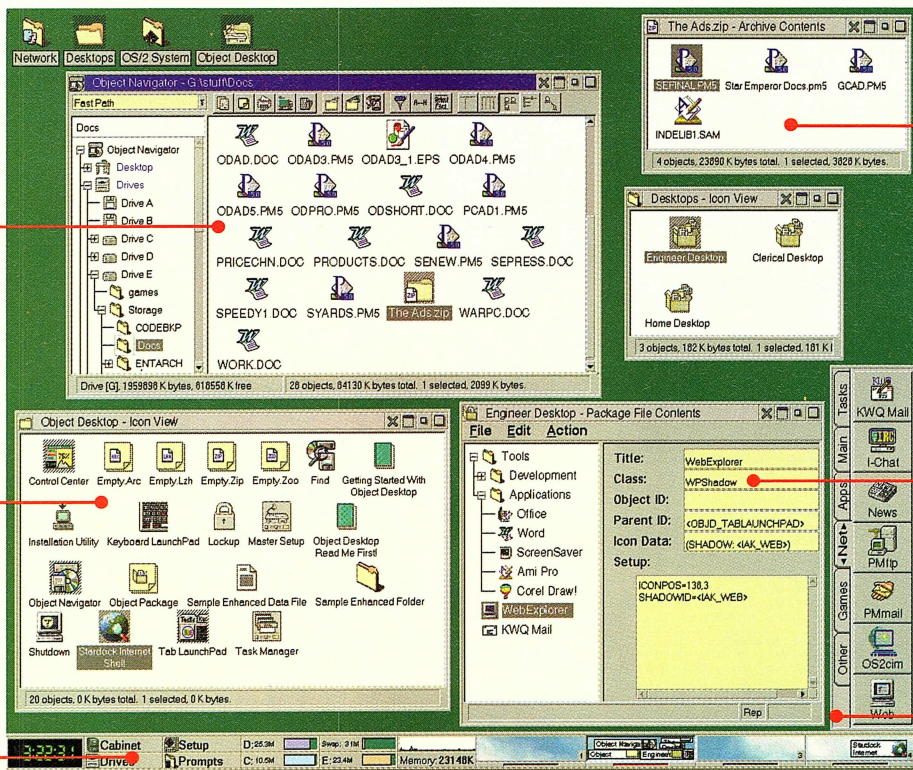
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Have You Upgraded Your OS/2 System Yet?

Object Navigator, the first object oriented file manager for OS/2, sees long file names on FAT partitions, shadows, program objects and uses OS/2's native association lists.

Object Desktop adds so many requested features to OS/2 that many new users consider it a third party upgrade to the operating system.

The **Control Center** monitors your resources, supplies virtual desktops, and even has cascading folders.



Object Archives allows you to work with your ZIP files as if they were standard OS/2 folders. View data and even run programs right from within the archive.

Object Package enables users to distribute their objects or entire desktops. It's truly the next generation way to manage your desktop.

The **Tab LaunchPad** allows you to manage your programs. It even keeps track of running programs in the "Tasks" tab.

"Object Desktop brings the OS/2 desktop up to its potential and, in doing so, brings it up to date. And it does it so well, I predict it will be an instant hit and best-seller for OS/2 for a long time. No one who sees it will want to do without it."

-InfoWorld.

"Object Desktop makes OS/2 look and feel like a new version."

-PC Magazine

"With the fine reputation Stardock has developed for OS/2 applications, I don't hesitate to recommend Object Desktop fully."

-OS/2 Magazine

"Object Desktop complements OS/2 so well that your immediate response is bound to be, 'That's the way a computer is supposed to work.' If you use OS/2, get Object Desktop. It's simply splendid."

-Computer Shopper

If you want to get the most out of your OS/2 system, you need Object Desktop. It's a powerful yet easy to use desktop environment that leverages the strengths of OS/2 to bring it to a whole new level of power, productivity, and performance.

By working with OS/2 users and IBM over the years, Stardock has created a product that provides the features and functionality that customers have been asking for.

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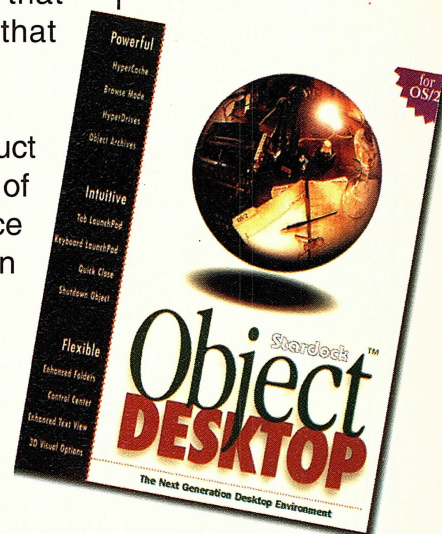
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"Object Desktop is the first thing I put onto all my PC's!"

-David Barnes



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Perspectives

The Software Company

“You cannot be arrogant when you have 5% market share.” With those words, Gian Carlo Bisone dismissed the legacy of the Old IBM. Mr. Bisone is general manager of software marketing, only a couple of levels away from CEO Lou Gerstner. A veteran of the PC clone wars, he left Compaq to join the brand-new IBM Software Group in mid-1995, and his charter spans midrange to mainframe, OS/2 to DB2, REXX to AIX.

We met with Mr. Bisone in early April. The week before, we completed our first test of OS/2 Warp Server (p. 24). IBM formally unveiled “Project Eagle,” its family of seven Software Servers. *Infoworld’s* readers chose OS/2 Warp as Product of the Year for an unprecedented fourth year in a row. For the second year, *Infoworld’s* Stewart Alsop belittled his readers’ choice. Describe Inc. announced that it was ceasing all development of its word processor. Sundial Systems announced that it had purchased the Clearlook word processor. It had been a busy week.

Not just busy for us, but for Mr. Bisone as well, as he also took charge of the Solution Developer Operations. He’s involved with a massive restructuring of how the International Business Machines Corp. sells its software and services. No longer can it be perceived as a monolithic hardware company, he says, that happens to sell software in support of its mainframe and workstations business. In today’s world of compressed product lifecycles and feverish competition, IBM must behave like a modern software company. And *that* means effective marketing.

Forget old-style IBM marketing, which meant sending a polite blue-suited salesman to tell the CFO, “Trust me, we’ll tell you what you need.” That tactic failed miserably when IBM turned to personal computers and personal-computer software.

Gian Carlo Bisone’s team has three goals: Focus on winning customers that IBM doesn’t already have, rather than trying to sell more products to the same huge corporations. Build a better channel of software distribution, instead of trying to push everything through IBM’s own sales force. And simplify the company’s menu of product offerings; the Eagle announcement is a first step in that direction.

What about OS/2? IBMers are sensitive to the fact that although they’re the world’s largest software maker, they’re a distant #2 on the desktop. For that reason, if for no other, they’ll continue to offer OS/2 and AIX as alternatives to Windows NT. They’re also serious about making OS/2 Warp Server a major player. Makes sense: there are opportunities in this fast-growing space where *no* vendor (not Microsoft, not Novell, not Sun) has a really dominant share of the market.

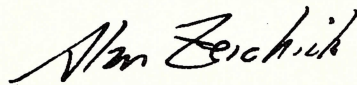
To that end, says Mr. Bisone, IBM will begin aggressively marketing OS/2, with an initial focus on OS/2 Warp Server. Beginning this summer, they’ll begin promoting the “Merlin” upgrade to OS/2 Warp Connect (see p. 12). The message will be that OS/2 is great for the connected consumer running mission-critical apps. (Just who is the “connected consumer”? Someone who needs LAN or dial-up communications to get the job done in the office, at home, or on the road, but still wants to be able to play a computer game after work.) To that end, IBM will finally tout OS/2’s unique benefits, in particular by hyping Merlin’s built-in speech recognition engine.

Sounds great. But can IBM deliver? They’ve made some good moves, like creating the Software Servers. Mr. Bisone told us that soon all IBM PC Co. systems will be bundled with Lotus SmartSuite. He’s recognized that it’s essential to help independent software developers sell their completed products (as Mr. Bisone put it, “we should go to market together”). And he solemnly promised that all new desktop products from the IBM Software Group will be multiplatform, OS/2 and 32-bit Windows, as of the initial shipment. (We’ll hold him to that.)

The move to encompass Windows 95/NT is necessary, Mr. Bisone and other executives argue, because customers will no longer accept single-platform solutions. In the 1980s and early 1990s, IBM spent a fortune inventing expensive proprietary technologies, and then concocted elaborate marketing. While IBM was busy perfecting its plans, nimbler competitors ate their lunch. IBM can’t afford to let that happen again, and that means supporting other platforms, including Win32, for tools, applications, and middleware.

Mr. Bisone admitted that IBM can only succeed if it gains mind share as a key player in the PC software business, and in particular, as a credible competitor to Microsoft Corp. The company must reverse the perception that it’s incompetent in the PC software market—and soon. Mr. Bisone himself sees only a short window of opportunity for IBM’s software business, perhaps through mid-1997.

Nobody doubts that IBM has tremendous financial and technological resources. If IBM truly focuses those resources on gaining customer mind share and on overcoming its deserved reputation as a somewhat irrelevant player in the PC software business, that’ll truly be the end of the Old IBM.



Alan Zeichick
Editor-in-Chief



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Letters

"If our software is not up and running every second of every day, loss of property, or even life, can occur."

Vinca v. Novell SFT III

Dear Editor:

After reading Wayne Rash's article regarding hardware failures ("The Network Connection," April 1996, p. 76), my general feeling on the article is that it was very informative for those who know little to nothing about the fault-tolerant measures they can take.

However, I believe that Wayne's "endorsement" of Vinca's Standby Server may be a little over zealous.

Our company writes software for the alarm industry, and our customers use our software to dispatch the police, fire department, and others needed by millions of alarm system subscribers. Our system is truly a mission-critical application. If our software is not up and running every second of every day, loss of property, or even life, can occur.

Underwriters Labs (U.L.) places very strict guidelines on the alarm central station, and there is no bargaining. Our software is U.L. listed, just like a toaster or other appliance. The listing is "1981" that encompasses the software and "1950" that covers the alarm company's central station facility itself (the building structure, training, etcetera).

U.L. 1981 requires that automation software be able to recognize the failure of any device that would keep it from operating normally and switch to a backup device within 90 seconds. Another 15 seconds is allowed for the central station operators to verify and ensure that everything is functioning properly. Since standby packages like Vinca's must bring up the "fake" server as a renamed server, all worksta-

tions lose their connections to the network. They also lose any unsaved data, including alarm dispatch activities. Even if the Vinca system could come back online within the time limits, there is still a very real risk of loss of data since the operators must log back onto the network.

With Novell SFT III, when the primary server dies, the workstations see between two and five seconds of "lock-up" as the network shell waits for the switch to the other server. After this momentary lock-up, each screen is exactly as it was, each cursor is in the same place, and nobody knows anything's happened (except the stations that receive broadcast messages from the server to alert them of the failure).

I don't want to seem judgmental or criticizing, but I want to make sure you understand the obvious difference between sites that think they are mission-critical (which Vinca's product would work fine for) and truly mission-critical sites.

We explore every avenue we come across in regard to fault-tolerance, and, to date, Novell SFT III is the only solution we can recommend.

Steve Ryckman
Technical Supervisor
Security Information & Management
Systems Inc.

I agree with you completely; as nice as Vinca is, it's not Novell SFT III. The two systems aren't really in the same ballpark. On the other hand, a Vinca installation is far less expensive than a Novell SFT III server installation, and runs under LAN Server, which is important for installations that need both OS/2 and decent fault tolerance. Vinca's dial-in server is for a company that needs access all the time, but that wouldn't suffer loss of life or other catastrophe if it were to be down for a few minutes.

On the other hand, there really isn't much out there that compares to Novell SFT III when it's used in an application such as you mention.

-Wayne Rash

Dear IBM

Dear Editor:

Following in the footsteps of the now famous "Dear Gil" letter (to Apple CEO Gil Amelio) that appeared in *InfoWorld* recently—

Dear IBM:

I am not "a company." I am a computer professional who relies on being able to learn new products/technologies at home to keep up with development tools and trends, in order to stay valuable to my firm.

As a GIS applications specialist, I've noticed the lack of *inexpensive* tools for OS/2 for me to continue this learning requirement. I need a Borland Delphi, Microsoft Access, and ArcView solution for OS/2.

There are no desktop mapping products (ArcView, MapINFO), inexpensive single-user SQL databases (Watcom SQL comes close but is expensive), or common client/server development tools (Borland Delphi, OraclePower Objects).

I have invested \$1,000 in OS/2 software that will probably rot because I'll likely have to abandon OS/2 just to keep up with common, current tools.

When Oracle drops Power Objects and Adobe drops Framemaker, the signs are pretty clear that (for whatever reason) the OS/2 market is dead.

What can you say or do to make me feel comfortable with my choice of OS/2 for home use? Probably nothing. I will wait to see if and when SmartSuite revitalizes a lame OS/2 app market. It better be good. It better be better than the Windows 95 version. It better be stable, fast, and exploit OS/2's features.

If not, then there will be no reason to keep OS/2 since no mainstream apps will run on it.

I am desperate. I don't want to have to change. I don't want to be told (by VARs) that I made a bad decision going OS/2 in 1992.

Duncan S. Rowe

Errata

The price for the Standby Server 32 for LAN Server by Vinca Corp. was incorrectly listed in the April 1996 "Network Connection" (p. 76-77). The correct price is \$4999.

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Speech! Speech!

BY ALEXANDER ANTONIADES

Merlin takes form

As the summer season approaches, Merlin, code name for the next release of OS/2, is increasingly on the lips and minds of almost everyone in the OS/2 community. So, on a brisk spring day, we went down to IBM's Austin facility, where the Merlin development is taking place, to ferret out the latest information about this upcoming release.

First of all, Merlin will be the next release of OS/2 Warp Connect FullPack; all other versions of OS/2 Warp and OS/2 Warp for Windows will be consolidated into this single version. Merlin will ship as two packages, a new user edition and an upgrade from OS/2 Warp. Like OS/2 Warp Connect, Merlin will only be available on CD-ROM.

An updated BonusPak will also be included on the same disc, but its contents hadn't been settled at the time of our visit. One application that will likely be included, however, is Photoworks, a simple image editor that was ported over from Windows 95 using the Developer API Extensions (DAX).

Another packaging enhancement should help to address one of the biggest shortcomings of OS/2 for new users. A device driver CD-ROM, which will contain hundreds of device drivers not previously packaged with OS/2, will allow users to make their computers functional without having to navigate bulletin boards and online areas.

The new feature that will doubtless garner all of the notoriety is the bundling of a modified version of IBM's highly regarded software speech recognition engine. According to IBM, this new version of the speech engine won't require special hardware or voice training, so it will work on any PC with a 16-

bit OS/2-supported soundcard. Out of the box, Merlin will offer voice navigation around the Workplace Shell and speech dictation into any program that supports OS/2's clipboard.

While the speech engine should work with most soundcards, IBM recommends at least a 100MHz Pentium with 16MB RAM to function correctly.

Outside of voice support, the most noticeable change will be a number of visual and usability enhancements to Merlin's Workplace Shell. These include flashier icons and new window control buttons that have a one click close button (similar to Windows 95, Xit, NPS, and Object Desktop), and restyled notebooks called infoboxes with vertical tabs similar to those in the Lotus SmartSuite 96. Speaking of the SmartSuite, Merlin will also come bundled with a modified version of Lotus' SmartCenter utility, called WarpCenter, which will effectively replace the still included LaunchPad. In addition, Merlin will sport some Internet shell extensions, similar to Lynn's Workplace Shell FTP shareware program.

Other new features under the covers will add to Merlin's functionality, but their usefulness will depend on how many OS/2 software developers make use of them. These features include new systems management hooks and electronic distribution mechanisms to help administer Merlin clients from other workstations and servers, as well as ease remote software installation hassles.

At the heart of Merlin are a number of technologies that are available today in the various forms either through FixPaks or Developer's Connection CD-ROMs. Integrated into the code base of Merlin will be the Developer API Exten-

sions (DAX), OpenDoc 1.0, the new SES Security APIs, Object REXX, and OpenGL.

Two mainstays of Windows' underlying technology are making their way over to OS/2 as well: Plug 'n Play, which allows Plug 'n play enabled hardware devices to configure and reconfigure themselves, and TrueType, the scalable type technology included with Apple's and Microsoft's operating systems.

Merlin will also have something new for those users who are still interested in running their DOS and Windows applications. Win32S support, necessary to run some of the newer Windows programs under Win-OS/2, will be upgraded to 1.25a, better known as the version necessary to run Netscape 2.0. Another new feature will be a new type of virtual DOS session similar to the single application mode of Windows 95. When this session is started, all current OS/2 activity will stop and a single DOS kernel emerges to run finicky DOS programs that break OS/2's DOS emulation rules. According to IBM, this enhancement will allow programs that previously required rebooting to DOS to be run in this new type of session.

Merlin will carry these and other features into battle as IBM tries to win mind and market share from Microsoft in an effort to appeal to the "connected consumer." Will it be enough? Well, you be the judge; the first public beta of Merlin should be available by the time you read this article.

OpenDoc 1.0 out on OS/2

There was news on the OpenDoc front, as CILabs and IBM released OpenDoc 1.0 for OS/2, which now joins Apple

Three times InfoWorld compared portable C++ visual builders. Three times zApp Developer's Suite won.

zApp Vanquishes C++ Views

"zApp Developer's Suite did a better job overall at both porting and interface creation."

Infoworld (12/12/94)

zApp zonks Zinc and waxes Wndx

"zApp Developer's Suite, the winner in our December 12, 1994 comparison, remains in first place. The other three products couldn't match its WYSIWYG methodology or one-button quick start procedure..."

Infoworld (2/6/95)

zApp extinguishes XVT and neutralizes Neuron Data

"It's no surprise that the product with the best usability, RogueWave Software's zApp Developer's Suite 2.21, scored the highest. For fast application development and transparent portability, zApp's ease of use puts it far above the other two."

Infoworld (12/4/95)



The reviewers at *InfoWorld* learned that for quickly building portable C++ GUI applications, **nothing** beats the zApp

Developer's Suite. And they should know; they ran the product and five of its best competitors through the wringer. Eight people collaborated,

twenty thousand words were written, and twenty-two full pages ran in *InfoWorld*. The results were conclusive: In every review, the zApp Developer's Suite won, by over a full point on a ten point scale over its next closest competitor.

For a complimentary reprint of this entire review, please call (800) 487-3217 and get a glimpse of what everyone is talking about.



Rogue Wave
SOFTWARE

Reader Service No. 8

Macintosh as a supported platform. The shipping code, which requires that FixPak 17 be installed, is available either from IBM's Club OpenDoc Web page (<http://www.software.ibm.com/clubopendoc/index.html>) or through IBM's Developer Connection CD-ROMs.

This big news was soon accompanied by Object Management Group's (OMG) announcement that it will endorse OpenDoc as an open standard to go with its Common Object Replacement Broker Architecture (CORBA). This latest wrinkle in the object/component architecture wars adds some strength to OpenDoc's case, but can also be viewed as the object-oriented community's attempt to circle the wagons in anticipation of Microsoft's Network OLE.

Ultimately, the key to OpenDoc's success will be how many programs actually use it. At the OMG announcement, Apple claimed that more than 500 Macintosh developers have expressed support for OpenDoc and

half a million copies of the OpenDoc Software Development Kit for the Macintosh have been shipped. Apple's announcement holds some promise for OS/2 users because one of OpenDoc's strengths is supposed to be portability.

However, the OpenDoc community still exists on paper more than it exists in real life. Most OpenDoc developers on OS/2 and Macintosh are loyal to their platform first and to any cross-platform initiatives second. Often, the prevailing sentiment is against Microsoft and OLE, instead of for other OpenDoc members. These attitudes will need to change before anyone can expect this cross-platform initiative to succeed.

Project Eagle takes flight

The IBM Software Servers, formerly known by their code name, Project Eagle, have been released as new options for buyers looking for IBM middleware. In this initiative, IBM has merged 58 separate products into 7 Software Servers.

In some cases, the servers are simply repackaged versions of single products (for example, the Workgroup Server is Notes 4.0), but in most cases they are consolidations of many products. The seven servers are Transaction server, Workgroup server, Database server, Internet access server, Communications server, Systems management server, and Directory and Security server.

In addition to the simplification of options, IBM will also offer these servers over three platforms—OS/2, AIX, and Windows NT. The last platform in this list will surely raise the eyebrows of the OS/2 zealots as IBM ports a number of key applications to OS/2's arch rival.

All the existing components that make up the Software Servers will still be available as stand-alone products, although the Server bundles in many cases are major price reductions. For more information see the IBM software home page at <http://www.software.ibm.com/is/sw-servers/>. **OS/2**

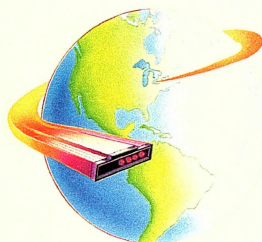
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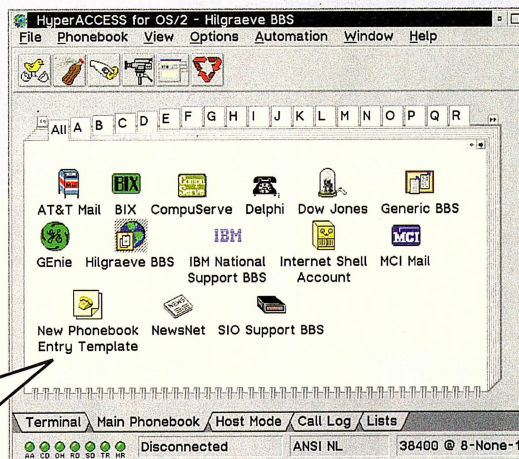
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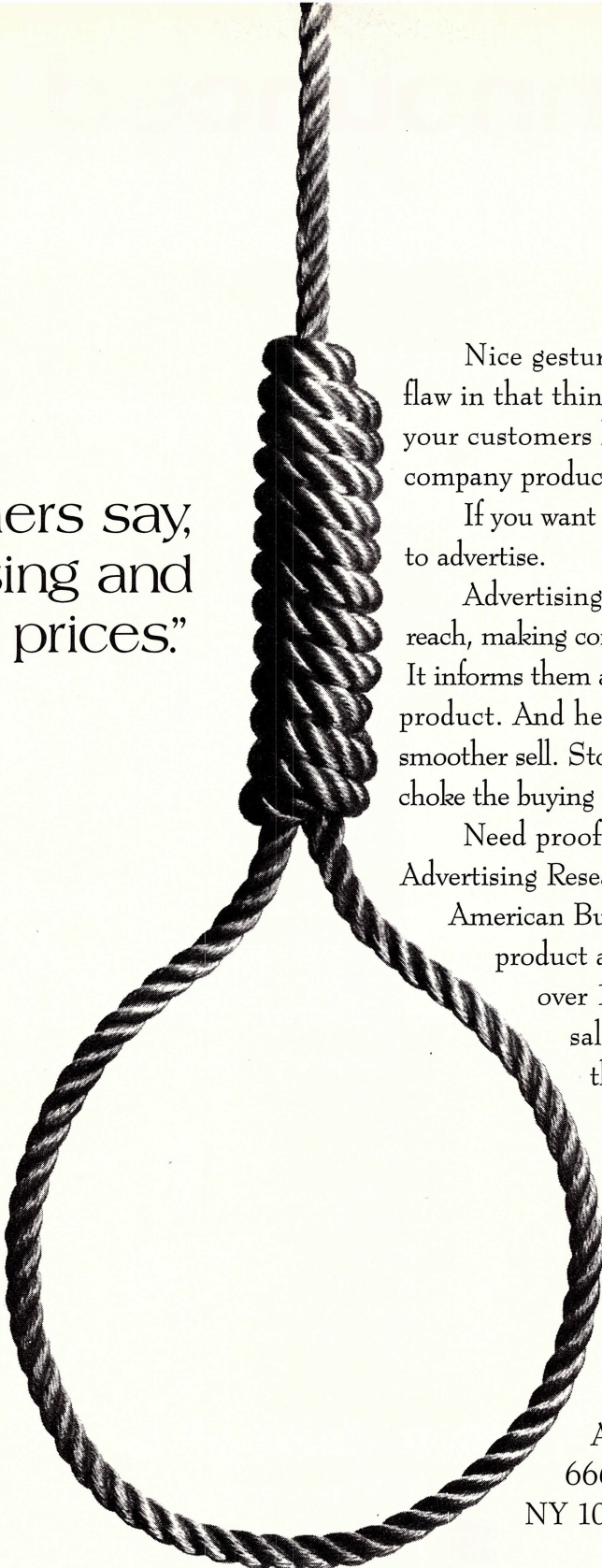


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For more information on the impact advertising has on sales, write the American Association of Advertising Agencies, Dept. Z, 666 Third Ave., New York, NY 10017-4056.

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Just Announced

New products for
the OS/2 community

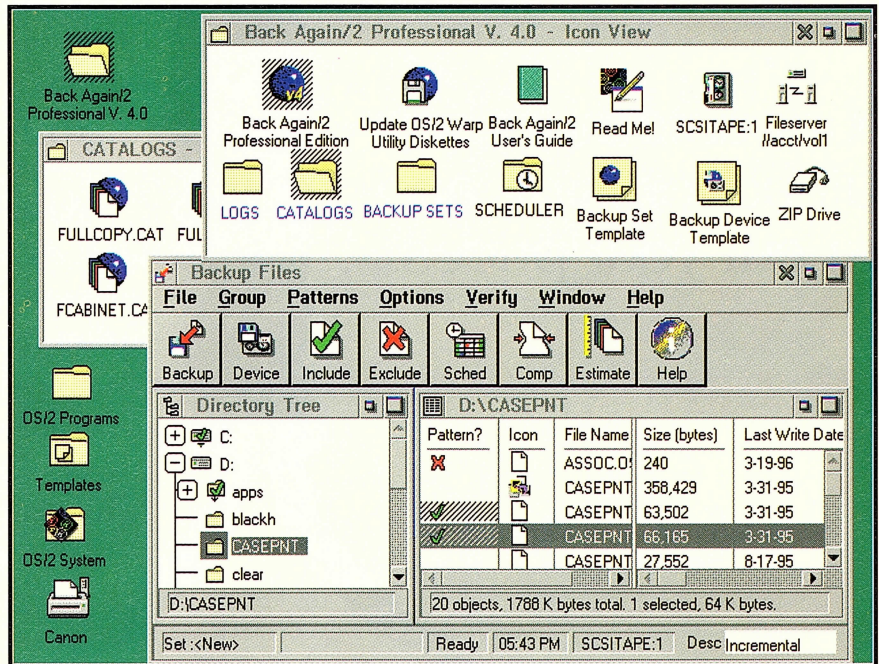
Back Again/2 Professional 4.0

Update to backup program

Computer Data Strategies announces the availability of Back Again/2 Professional 4.0. New in this release is a scheduling Workplace Shell (WPS) folder, the ability to configure any external command to execute before or after a backup is performed, and more robust Workplace Shell integration. This program supports SCSI and ATAPI/IDE tape drives, removable media (such as Iomega ZIP/JAZ/Bernoulli, and Syquest), IBM LAN Server, and floppy disks. Back Again/2 Professional 4.0 is priced at \$149; upgrades from earlier versions can be purchased for \$49 until May 31, 1996, and then for \$79 after the 31st. Competitive upgrades from other backup products are \$79.

Computer Data Strategies, (800) 284-4156, (612) 730-4156, fax (612) 730-4161, e-mail sales@cds-inc.com, or see its Web page at <http://www.cds-inc.com/>.

READER SERVICE NO. 110



FileStar/2 2.0

Update to PM file manager

SofTouch Systems releases an update to its OS/2 graphical file management utility. FileStar/2 2.0 adds new features, such as a "traveling briefcase" that synchronizes files between computers, a configurable function button bar, file undelete, directory and file compare capabilities, Workplace Shell object creation, and global directory support. Other enhancements include performance improvements, additional file sort options, multiple-directory file windows, and autoscroll of directory trees when a directory is expanded. FileStar/2 2.0 is priced at \$79, with a 10-user license available for \$599. Copies of FileStar/2 1.0 purchased after

January 1, 1996, include a free upgrade with valid proof of purchase.

SofTouch Systems, (405) 947-8085, fax (405) 632-6537, e-mail webmaster@softouch.com, or see its Web page at <http://www.softouch.com>.

READER SERVICE NO. 111

Object Desktop 1.5

More WPS enhancements

Stardock Systems is releasing an update to its OS/2 Workplace Shell productivity enhancement tool, Object Desktop. New in the release is Object Package, which backs up WPS object and desktop settings into a single file. Other new features include Internet shell extensions, performance improvements, window roll-ups, and improved versions of the Object Navi-

gator and Command Center. Object Desktop 1.5 is priced at \$89.95. The introductory upgrade price is \$37 for people who purchased Object Desktop 1.0x before April 1, 1996; the upgrade is free to those who have since purchased it.

Stardock Systems, (800) 672-2338, (313) 453-0328, fax (313) 453-1480, e-mail info@stardock.com, or see its Web page at <http://www.stardock.com>.

READER SERVICE NO. 112

PM Mail 1.5

Updated Internet mail program

Southside Software releases an update to its Internet mail program for OS/2. PM Mail 1.5 adds the MIME and BinHex transfer protocols

Just Announced

to the existing uudecode support for receiving and sending files. Other new features include improved filters, a new user interface, spell checking, support for multiple accounts, and remote management of messages on e-mail servers. This upgrade is free for existing PM Mail users and \$40 for first-time buyers.

BMT Micro, (910) 791-7052, fax (910) 350-2937, e-mail 74031.307@compuserve.com. Also see Southside Software's Web page at <http://k2.cwru.edu/~rrn>.

READER SERVICE NO. 113

MR/2 ICE 1.0

New Internet e-mail

Secant Technologies is releasing a new Internet e-mail package for OS/2. MR/2 ICE 1.0 is an Internet mail client capable of SMTP/POP3 send/receive that includes filters, message printing, and supports all ISO-8859 conversions, including ISO Latin-1 and Latin-2. This program can receive

uuencoded files unassisted and can receive BinHex and MIME using free utilities available from Secant's Web page. Other free utilities available include support for PGP and a spell checker/Thesaurus module. MR/2 ICE is priced at \$25.

BMT Micro, (910) 791-7052, fax (910) 350-2937, or e-mail 74031.307@compuserve.com. Also contact Secant Technologies, e-mail nick@secant.com or see its web page at <http://nick.secant.com/mr2ice.htm>.

READER SERVICE NO. 114

Secure Workplace for OS/2 4.0

Updated OS/2 security

Syntegration Inc. is updating Secure Workplace for OS/2 to version 4.0. New in this release is an enhanced Workplace object access control, which allows configuration and enforcement of user- and group-based permissions for files, directories,

and Workplace Shell objects. The Secure Workplace also allows administrators to customize user permissions in a desktop or provide users with their own desktop. The Secure Workplace for OS/2 4.0 enables single sign-on to a network operating system or remote host. The Secure Workplace 4.0's Standard Edition lists at \$79.95, excluding multidesktop management. The Professional Edition, which includes multidesktop management, lists at \$120. Registered users can upgrade to the 4.0 standard edition for \$29.95 and to the 4.0 professional edition for \$45.00. Customers who purchased Secure Workplace for OS/2 3.x after March 15, 1996 will be entitled to a free upgrade to 4.0.

Syntegration Inc., (909) 464-9450, fax (909) 627-3541, e-mail 73707.3331@compuserve.com. Find out more from Syntegration's World Wide Web site at <http://www.primenet.com/~syntegrn>

READER SERVICE NO. 115

Clearlook 1.7

Changes to OS/2 word processor

Sundial Systems, the new publisher of the Clearlook word processor, announces the "rebranding" of the word processor as a Sundial Systems product, with all contact and support information updated. New with this release, is the inclusion of the complete Clearlook User's Guide in native Clearlook format and serving as an extended example of how Clearlook can be used to process large documents. Minor improvements have been made in a number of areas, including some of the import filters; all known bugs have been also addressed. This version is intended to serve as the baseline for on-going technical support and enhancement provided by Sundial Systems. Though the list price remains \$169, a promotional price of \$89 will be offered until July 31, 1996.

Sundial Systems, (310) 596-5121, fax (310) 598-9851, or e-mail relish@ibm.net.

READER SERVICE NO. 116

OS/2 APPLICATIONS TOP 15 LIST—MARCH 1996

This Month's Rank	Last Month's Rank	Product	Company
1	1	Partition Magic 2.0 Personal Edition	PowerQuest
2	2	Object Desktop	Stardock Systems
3	3	DeScribe Voyager CD	DeScribe
4	4	Backmaster 2.0	MSR Development
5	8	Hobbes CDROM Archive	Walnut Creek
6	6	IBM Antivirus	IBM
7	10	Galactic Civilizations 2.0	Stardock Systems
8	5	System Commander 2.2	V Communications
9	7	UniMaint 4.0	SoftTouch Systems
10	15	FaxWorks Pro 2.0 Upgrade	Global Village
11	9	GammaTech Utilities 3.0	SoftTouch Systems
12	-	MicroLearn GamePack Volume 2	MSR Development
13	11	BackAgain/2 Professional	Computer Data Strategies
14	-	Bitstream Font Collection	Bitstream
15	-	SoftTouch Suite	SoftTouch Systems

Since OS/2 Warp and OS/2 Warp Connect are consistently ranked as top-selling products, and sales of additional licenses can sometimes skew results, this list has been modified to highlight only the top-selling OS/2 applications. (Best-seller information courtesy of Indelible Blue.)

Just Announced

Prominare Designer 5

Updated GUI Development Tool

Prominare announces the latest release of its OS/2 Presentation Manager-based development tool for creating GUI front ends in OS/2, Windows, and Windows NT. New in this release is the addition of simpler dialogs for styles, an expert mode for advanced users, added support for dialog font metrics undo/redo facility, additional DLL support for code generation, and better support for viewing source code. Prominare Designer Release 5 has a suggested retail price of \$195 (without hardcopy manual) and \$249 (with hardcopy manual). Upgrades are available from Prominare for \$99 (without hardcopy manual) and \$139 (with hardcopy manual).

Prominare Inc., (416) 363-2292, fax (416) 363-6157, e-mail query@prominare.com, or see its Web page at <http://www.prominare.com/prominare>.

READER SERVICE NO. 117

CallerID/2 1.0

Who's calling?

Rhintek is releasing an OS/2 package designed to run in the background of OS/2 and identify incoming calls using the caller ID protocol. CallerID/2 monitors the phone line on which a caller-id-enabled modem is listening; when calls are received, it then checks for the phone number in the database and performs an action. The three types of calls are recognized, unrecognized, and privacy-enabled. Each type of call triggers a pop-up window or plays a .wav file. CallerID/2 requires the use of a caller-ID-enabled modem and implementation of the caller ID service provided by the local phone companies. CallerID/2 retails for \$39.

Rhintek Inc., (800) 234-4546, (410) 730-2575, fax (410) 730-5960, BBS (301) 596-5618, or see its Web page at <http://www.rhintek.com/rhintek>.

READER SERVICE NO. 118

Just Announced OS/2 Internet Sites

OS/2 Beta Program Site

<http://www.teamos2.org/os2beta>

Extensive site of OS/2 applications that are currently in beta testing.

Ports, Applications and WisheS (PAWS)

<http://www.teamos2.org/paws/>

Add your wish list here or see what others are writing, porting, etc.

Aqui

<http://www.aqui.ibm.com/>

Check out this new exciting IBM technology with automatic links to sites and creation of your personal link list.

OpenDoc OS/2 Toolkit

<http://www.software.ibm.com/clubopendoc/tools.html>

The OS/2 1.0 GA toolkit has arrived! Port your application to the now-adopted industry standard.

OS/2 Web Server (free!)

<http://www.ics.raleigh.ibm.com/ics/icfgive.htm>

Download IBM's Web server products — no cost involved (other than download time).

SOMware on the Web

<http://www.software.ibm.com/objects/somobjects/>

Read all about IBM's SOMobjects technology and download the latest toolkits.

Multitask Consulting

<http://www.multitask.com.au/>

OS/2 news, software hot list, interesting OS/2 sites, and much more.

Warp Online

<http://in.net/~mcdonajp>

A new online OS/2 magazine promising "software reviews, solid articles, and insightful commentary on our shared interest."

UPDATED:

OS/2 Email Campaign

<http://www.teamos2.org/petition>

(Information courtesy of Vicci Conway, vicci@ibm.net.)

Persistent Object Manager Toolset

Object-oriented programming aid

Secant Technologies releases a new tool to aid in the building of object-oriented applications. The Persistent Object Manager (POM) Toolset uses its own Metadata compiler to compile all parts of a program into a working C++ object model. Addition-

ally, an object manager allows operations such as rollback, checkpoint, and commit-to-be-applied to in-memory objects and databases. The POM Toolset is available for C++ and SOM-enabled languages that run on OS/2 and Windows 95 and Windows NT. Pricing for this product was unavailable at presstime.

Secant Technologies, (216) 595-3830, fax (216) 595-0199, e-mail info@secant.com, or see its Web page at <http://www.secant.com>.

READER SERVICE NO. 119

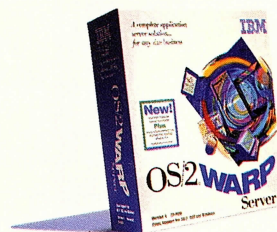
OS/2

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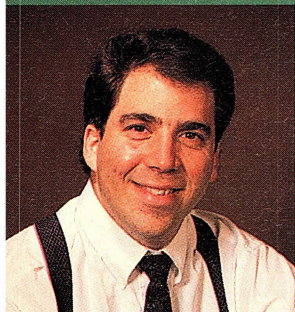


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capabilities include systems
management, so it's ready to
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Web Exploring and Other Quandaries

BY DAVID REICH

TIP 233: WEBEXPLORER THROUGH COMPUSEVE

Q: I really like WebExplorer, but my link to the electronic world is through CompuServe, and I don't want to pay for a second service provider. How can I get WebExplorer to work with CompuServe?

A: Funny you should ask, because I recently went through this process myself. I would like to thank Evan and Noel Bergman at Development Technologies for helping me through; I was not able to find documentation on this procedure myself.

First, determine your CompuServe access number and line speed. I'll assume you already know them because you already use the service. Now, open the IBM Information Superhighway folder on your desktop; then open the Internet Utilities folder within it. Look for the object labeled **Dial Other Providers**. With a left button double-click on the mouse, open up that object. Now you are going to create a new entry to tell it how to dial CompuServe. Once the connection is established, you can use the WebExplorer.

The first page on the notebook is the login information. Where you see ***Name**, type "CIS." Enter "CompuServe" for the description. The next two fields are for your CompuServe ID and password. To move between the fields,

you can use either the <Tab> key or the mouse to move the pointer to the next field and change the focus with a click. We'll skip the login sequence for a moment and click on the PPP button just below it. This connection is the type you will use with CompuServe. Now for the login sequence.

This part is the trickiest and should be typed as shown. Note the spacing, as well as the upper- and lowercase of each character. Each line is terminated with the <Enter> key. So, for example, the first line is:

```
\r
```

and you hit the <Enter> key to go to the next line. When you reach the end of the code sequence, you will click on the small right arrow to take you to page two of the notebook to continue the configuration. For the login sequence, enter the following:

```
\r
ame:
CIS
ID:
[LOGINID]/GO:PPPCONNECT
ord:
[PASSWORD]
PPP
```

Now go to page two of the notebook. Make sure the field that says ***MRU Size** has the number 1500 and that the VJ Compression box has a check mark. If it does not, click on it to check it. Now click on, or tab, to the Domain Name-server field. Enter the following address: 149.174.211.5; then tab to the field that says Your Domain Name. Type in "compu-serve.com"; then click on the right

arrow to get to page three. This page is optional, but I have, for example, *news.CompuServe.com* as my news server.

On the next page is the modem information. Much of it is the same as for any other communications software you may have. Select the type of modem, port, speed, and other relevant information, and you're done. You can now close the notebook for that dialer entry, and it's ready for use.

To connect to the Web via CIS, just open up the Dial Other Providers, select the CIS entry, and click on Dial. It will connect you to CompuServe. You can see the status in the window the dialer gives you. Once you are connected, you can start up the WebExplorer and surf away.

TIP 234: OVER 16

Q: Will OS/2 Warp Connect access more than 16MB, or is the memory beyond 16 only useful as, say, a swap file. I thought I once read that OS/2 Warp didn't address greater than 16MB?

A: This question comes up periodically, and the answer can be confusing, though it has become easier with new hardware on the market. With the right hardware, OS/2 Warp will address about as much physical memory as you can cram into your system. I have not personally seen anyone use more than 64MB, but I believe you can put much more in there.

The qualification of "the right hard-

ware" is important. You see, 16MB was a limit in earlier hardware. With the new 32-bit processors and 32-bit-and-wider bus technologies, you can directly address much more than 16MB. It must be stressed, however, that the hardware has to enable the software to do it. To that end, the disk controller is important. The direct memory access of that card in your computer must be able to support 32-bit addressing in order for OS/2 Warp to effectively use more than 16MB of memory. If your controller is a 24-bit controller, for example, the first 16MB are used as direct, paged memory, and the remaining memory above 16 is used as swap file number 1.

As a result, data that needs to be swapped or paged will be written to this faster memory instead of to the slower disk. When all that memory is used up from swapping, then a physical file on disk will be used. If your controller is a 32-bit controller, then all of your available memory will be used as direct paged memory, and the swap file on the disk will be sent to where your data is paged, should it be necessary.

TIP 235:

NOT EXPLORING

Q: I have a perplexing problem. The IBM WebExplorer refuses to work no matter what I do. After configuring my Internet connection, everything else works fine, but the WebExplorer 1.03, which I downloaded from "Retrieve Software Updates," refuses to even start after a connection is established. If I start the WebExplorer before a connection is established, all I get is "The URL you have requested has been abandoned." I have checked with everyone I know and have checked several reference books with no luck.

A: Sounds as though you were using a prior version of the WebExplorer without any problem, and this problem only surfaced after you pulled down version 1.03. While this problem is document-

ed in the WebExplorer 1.03 *Readme*, many people overlook that a TCP/IP update is needed to move to version 1.03 of the WebExplorer.

The solution to the problem is slightly different depending on whether you use OS/2 Warp (or earlier) or OS/2 Warp Connect. If you use the former, you need the latest CSD (Corrective Service Disk) for TCP/IP 2.0 before you can run WebExplorer 1.03. If you have OS/2 Warp Connect, you need to have TCP/IP 3.0. These updates should be found in the .zip file for the WebExplorer 1.03. If you got your WebExplorer update with the **Retrieve Software Updates** icon right from the network, you should be able to get the TCP/IP update the same way. Just find the package appropriate for the version of TCP/IP you have and pull it down.

TIP 236:

DRAGGING THE WEB

Q: I'm running WebExplorer 1.03. Is it possible to copy an HTML document to disk with graphics intact? If I simply drag the HTML document to a folder, only the HTML is saved. If I subsequently drag the document back into the WebExplorer, all the graphic images have a big red X through them. I would like to view the HTML document complete with graphics while offline for reading and reference purposes.

I have found that I can get the desired result if I manually edit the IMG, SRC, and HREF links in the saved HTML document. Of course, I have to drag all the images out of the Web page and give them names. This process is not horrible, but it sure takes a lot more time than a drag and drop!

A: No way to do it that I have found. Due to the nature of the Web and HTML, each document, or graphic image, is something separate to be downloaded, or with regard to WebExplorer and copying documents, dragged

and dropped. The HTML file is a document written by someone, and the location of the graphic images are embedded directly in the HTML text so that the Web server knows where to find all related files to send them to your computer. I know of no way to drag or copy an HTML document and have the graphics pulled down with it and the links updated for your machine. One suggestion I have for you is to look in your TCPIP\TMP directory. All of the GIFs and such that are pulled down for viewing by WebExplorer are put in this directory, so you might want to use those rather than dragging and dropping each graphic. Neither choice is very convenient, but if you want to get the whole document, graphics and all, you need to do one or the other. If anyone has found an easier way, please let me know. I'll be glad to publish it!

TIP 237:

DRAG-AND-DROP UNZIP

Tom McKellips sent in a clever way to enable your file to perform drag-and-drop zip and unzip routines for your files.

When using *pkunzip.exe*, go to the Settings Notebook for the program reference object. Click on the Association page, then click on New Name and type in "*.zip". Click on the Add button. Next, click on the Session page and select DOS Window; check the checkboxes for **Start Minimized** and **Close Window on Exit**. With a left double-click, close the notebook. Now you can unzip any file you have on your hard disk just by double-clicking on it. The file will unzip to the same directory in which the zip file resides.

When using *pkzip.exe*, first create a program reference object for it on the launchpad or on the desktop. Open the Settings notebook by right-clicking on the icon and clicking on Settings. Click on the **Program** tab, and tab down to the **Parameters** field. In the parameters

More on ExePack

I have received several notes from readers referring to Tip #222 (March 1996, p.20) on packing executable files for better performance. The issue in question is packing these executable files after the program is built and shipped. I've been told by several readers that tools exist to pack executables after the fact. One such example is on IBM's own Developer Connection CD-ROM. The program is RePack, which, unlike most executable packers, works on the file without requiring the programmer to re-link the module. Another reader pointed out another program on the FIDO network, called */xlt101.zip*, which accomplishes the same function. Both of these programs should be used with caution, because you're working on files you essentially know nothing about. In particular, use the options in the program to first determine if the file can be, or is already, packed. Packing an already packed file (if the tool allows you) can ruin the file, so use care.

field, type "-a new.zip [source directory and file name]".

Next, click on the **Session** tab and check **DOS Window**, **Start Minimized**, and **Close Window On Exit**. Close the notebook with a double-click on the upper-right system icon. Now to zip up a file, all you have to do is drag it over the PKZIP icon and drop it. You will then be prompted for a directory and file name. If just you want to zip

one file, hit the **ok** button and a file called *new.zip* will be created in the directory containing PKZIP. If you want to zip a lot of files, mark them, then drag them to the PKZIP icon and drop them. When you are prompted, enter the Directory and file name (C:\MYFILES*.*) . This will cause PKZIP to add all the files to a file called *new.zip* in the directory of the files that are being zipped.

TIP 238:

LONG FILE NAMES

Q: Can OS/2 use long file names when saving files to a floppy?

A: A qualified "yes." Back in November 1995, I answered a similar question about why some applications can't save long file names onto FAT drives. This is a related topic.

Floppies can only be formatted with the FAT file system (unless you use some special shareware tools I've heard about that let you format floppies with HPFS). HPFS handles long file names intrinsically. However, FAT-formatted drives do not. Extended Attributes (EAs) are handled in FAT as well as HPFS. Because long file names are not really part of the EAs (they are really part of the directory entry for an HPFS file), they can't easily be moved to floppies.

The OS/2 command line interface will truncate a long file name to the 8.3 FAT file-naming convention when copying a file from an HPFS drive to a FAT drive (or floppy). However, if you use the Workplace Shell to drag a file to a floppy or to drag a FAT drive from an HPFS drive, it will create a *.longname* EA for you. The file's long name will be stored in this EA. If you use a command line to copy the file from the floppy to an HPFS drive, the long name will be lost (because the command line interface does not work with the *.longname* EA), and it will retain the truncated 8.3 name (even though the *.longname* EA will still exist). However, if you use the Workplace Shell to copy a file to another HPFS drive, the long name will be copied too.

The long and the short of it (no pun intended) is, if you use the WPS, no problem. The command line interface will truncate the file name to 8.3. **OS/2**

David Reich has been with the OS/2 development team since 1987. David is a contributing editor and has written numerous articles on OS/2. He is the author of Designing High-Performance OS/2 Warp Applications published by John Wiley and Sons. Questions can be addressed to David via CompuServe at 76711,632 and Internet at speedracer@austin.ibm.com.

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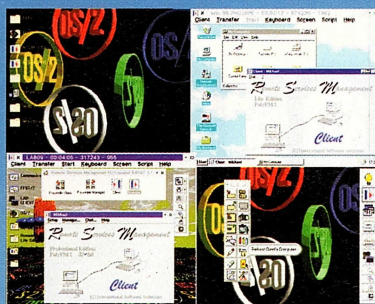
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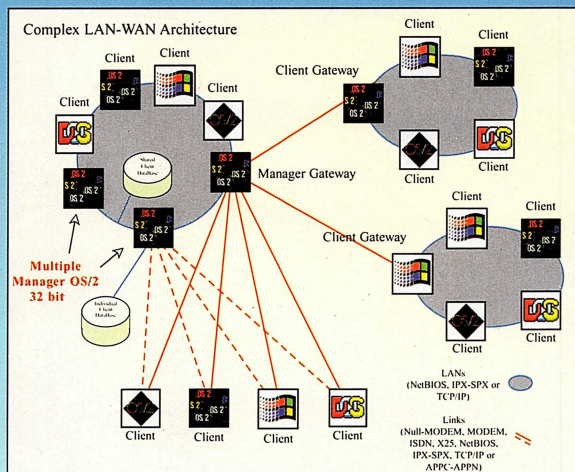
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OS/2 Warp Server: Ready for Primetime

BY WAYNE RASH JR.

Sometimes, the devil is in the details. That's the case with IBM's newest version of its venerable LAN Server network operating system (NOS), now called OS/2 Warp Server 4.0. This product has been in development for some time, and it's built based of a long history of solid, reliable, and secure network operating systems. You'd think that with that sort of background, OS/2 Warp Server would be nearly perfect, ready to take on the Microsoft juggernaut and its soon-to-ship Windows NT Server 4.

The good news is that OS/2 Warp Server is *mostly* ready. It's a strong, performance-oriented, secure network operating system that can handle the role of being an application server as easily as it can handle file and print services. The bad news is that many users, especially those new to any flavor of OS/2, may never discover this fact. IBM has left out enough seemingly minor details in designing the way the server starts



running, that it may be impossible to use the package without massive amounts of help.

We were only able to get OS/2 Warp Server working after a week of intense effort that was capped by a weekend visit from IBM. Without the personal visit by one of the engineers responsible for a major portion of OS/2 Warp's development, this would have been a one-sentence review. As it was, the problems with OS/2 Warp Server are serious enough that installing the software requires some special planning and may also require the services of a person intimately familiar with OS/2 Warp Server's inner workings. At least it will be that way until IBM fixes the problems that showed up in this review and in a number of other incidents after OS/2 Warp Server shipped.

The premise

IBM has designed OS/2 Warp Server to fit nicely into the growing world of heterogeneous networks. The idea is to make OS/2 Warp Server able to communicate with nearly anything else it's likely to encounter on the corporate network, whether it's Novell NetWare or Microsoft Windows NT. In addition, OS/2 Warp Server is designed to meet corporate standards more than halfway. This NOS can communicate with the Internet or a corporate enterprise network using TCP/IP. With some optional packages, it can talk to the company mainframe.

More important than just having the capability to communicate, OS/2 Warp Server does it well. Each external environment gets its own native standard, so Novell NetWare networks get more than just Novell's IPX networking. They also get support for Novell's NetWare Directory Service, an object-oriented network operating system that's rapidly growing in large enterprise environments and making a true directory service available to OS/2 and OS/2 Warp Server.

While OS/2 Warp Server beats Microsoft when it comes to NDS support, it joins Microsoft by supporting Windows NT Server. (Windows NT Server won't have NDS support until version 4 ships later this year.) OS/2 Warp Server fits seamlessly into the same domain structure as Windows NT and can work as a domain controller with Windows NT Servers or accept a role on a domain that has a Windows NT domain controller. Clients aren't ignored, either—there's a new client designed specifically for Windows 95.

What seems almost an anticlimax is the fact that OS/2 Warp Server also supports DHCP (dynamic host configuration protocol) on TCP/IP networks, which frees network administrators from the task of assigning and tracking IP addresses. With the support for TCP/IP comes support for a collection of TCP/IP applications, including such standards as **telnet** and **ping**. OS/2 Warp Server doesn't include a Web server, however, although one will be available from IBM soon.

Inside OS/2 Warp Server are a number of features that are only available on other

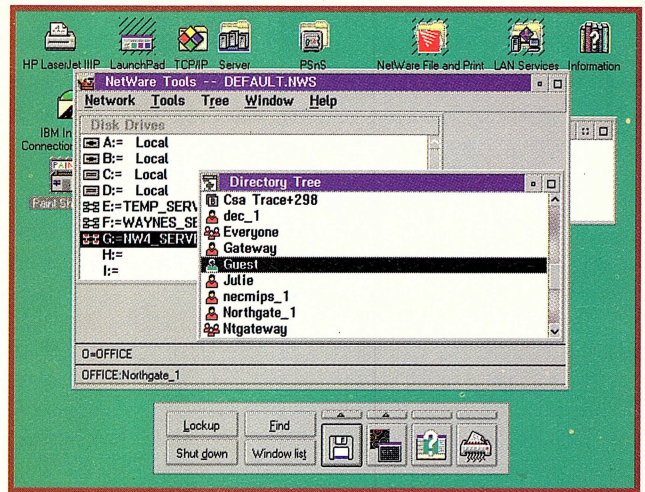


Figure 1: OS/2 Warp Server shows its ability to handle Novell NetWare NDS objects.

network operating systems as add-on programs or from third parties. These include a Remote Connection Service, which supports remote workstation communications as well as LAN-to-LAN connections. An advanced print server is also included that supports such things as PostScript-to-Hewlett-Packard translations. And there's what may be the most cleverly designed backup and recovery package in the industry in addition to a systems management service, a license manager, and even a software distribution utility.

Up and running

With all of those features going for OS/2 Warp Server, what might stand between it and world domination? Only one problem: You can't use the features if you can't use the network operating system itself. IBM has let some serious flaws slip past the testing process. Any of these flaws would probably discourage the new users that IBM needs so badly, but with OS/2 Warp Server, bugs come in bunches.

Unfortunately, the bunches of bugs show up just when users are least likely to be in a position to deal with them—

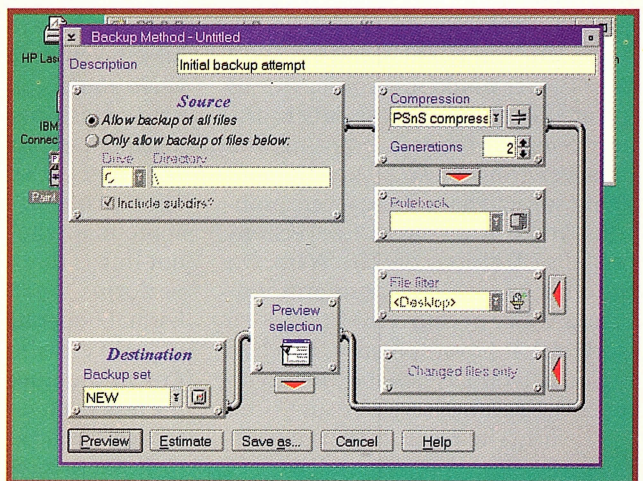


Figure 2: Personally Safe 'n Sound's graphical "plumbing" metaphor for backing up and restoring files.

In the Box

Just what is OS/2 Warp Server, anyway? This new product is defined by IBM as consisting of the OS/2 operating system plus networking products from IBM and other vendors. Confusingly, OS/2 Warp Server, version 4, is based on OS/2 Warp, version 3, and it's the replacement for IBM's LAN Server, version 4. At least they didn't call it "OS/2 Warp Server 96."

OS/2 Warp Server supports OS/2, Windows 3.x/95/NT, and DOS clients out of the box, and AIX and Macintosh clients with additional software. In a heterogeneous environment, OS/2 Warp Server works with NetWare, LAN Manager, Windows NT, and DEC's PathWorks. (Who uses *that*, we wonder?)

The network operating system comes in two flavors: Regular and Advanced. The difference is that the Advanced version includes disk mirroring, plus a high-capacity file system that IBM claims will support as many as 1,000 users (the regular OS/2 Warp Server is not recommended for more than 120 clients). The version reviewed here is the basic OS/2 Warp Server 4.0.

What are those "networking products"? They include Remote Connection Services, an upgrade to the LAN Distance remote-to-LAN connectivity tool included with OS/2 Warp Connect. There's Advance Print Sharing, which automatically converts ASCII or PCL-based print jobs to work on PostScript printers. Personally Safe 'n Sound is a graphical backup/recovery utility.

When it comes to administration, OS/2 Warp Server comes complete with IBM's System Management Services, which wraps up NetFinity and SystemView to remotely administer clients, servers, and network components. Also in the **sysadmin** camp is Dynamic Host Configuration Protocol (DHCP), which automates the hairy process of assigning and managing IP addresses. For day-to-day client management, OS/2 Warp Server includes CID, which helps distribute software over the LAN and the SystemView Licence Manager for enforcing site application licenses.

Not part of OS/2 Warp Server's automated install, but in the box, are SNMP (Simple Network Management Protocol) support, the Ask PSP help-desk database, and Mobile File Synchronization (for OS/2 clients only).

OS/2 Magazine will be providing extended coverage of OS/2 Warp Server over the next several months, as our writers and experts become more familiar with this new network operating system and its included and optional tools. —Alan Zeichick

format. We eventually got an almost casual suggestion to manually perform what the IBM engineers called a low-level format (use the /L switch with the format utility that comes on the CD-ROM), and that solved the problem. Unfortunately, no way exists to perform this type of format from within the installation process. You must exit to the command line and type in the command and the arguments, with no indication given from the manual that you should perform this operation.

Further complicating matters was a problem in which the OS/2 Warp Server tuning utility set the number of maximum connections during the installation process. Normally, this is a fairly arcane problem, except that in this case, the number of maximum connections is set so high that it leads to memory allocation errors. Adding to the confusion caused by this failure is the resulting error message that describes the failure as a hard disk problem. Until we fixed this problem, every attempt to load OS/2 Warp Server ended in an error trap and a listing of addresses in hexadecimal.

By now, it hardly seems important to complain about the fact that OS/2 Warp Server's NetWare installation still needs to have the network interface software manually configured. Nor does it seem particularly important to complain about the apparently random error traps that came and went without explanation during the process of setting up OS/2 Warp Server. These events seem to be a mystery to IBM as much as they are to us.

Be that as it may, we predict (with no sneak preview from IBM) that we'll be seeing FixPaks in the very near future. Or maybe an OS/2 Warp Server 4.01 that'll address these fundamental shortcomings.

System administration

Once you get OS/2 Warp Server running (and then take a well-deserved day or so off), the product is easy to use and logically designed. Most functions take advantage of OS/2 Warp's object-oriented Workplace Shell interface, so experienced OS/2 Warp users will feel right at home, and users migrating from Macintosh or Windows 95 will be able to get up to speed quickly. Most functions are configured

during the installation process. We'll take a look at the problems we encountered in detail, because they're likely to show up in a large number of installations. In addition, even experienced users of OS/2 Warp (including the IBM engineers who worked to help us in this review) can benefit by knowing where some of the potholes are before they hit them.

On one hand, the fact that OS/2 Warp Server would suffer from serious installation problems this late in the development process is surprising. The beta version of OS/2 Warp Server didn't seem to have these severe problems, and neither did earlier versions of IBM's LAN Server or OS/2 Warp. On the other hand, it's not as surprising as it might be, because IBM has been working hard to automate as much of the installation as possible, if only to meet the competitive pressure from Microsoft. The result is that most of the installation code is brand new.

We found that, in some cases, the new installation routines worked very well indeed. For example, the installer

correctly identified the type and settings of network interface cards and other installed hardware. We didn't need to tell it which SCSI controller we had, and we didn't have any sign of an earlier problem that OS/2 Warp Connect had with ISA SCSI controllers and memory above 16MB. Those problems are licked.

Unfortunately, other problems have taken their place. For example, when you install OS/2 Warp Server on a new machine for the first time, the installer performs a format operation and selects IBM's HPFS by default. That's fine to do, and HPFS is an appropriate choice for a server. What's not fine is that the formatting utility performs what IBM calls a "Quick Format" operation, which does little beyond clearing the root directory. Any information that was already on the disk is left unchanged, and that information causes problems.

In fact, we found that a series of mysterious installation and operation failures were apparently caused by the failure of the format utility to, well,

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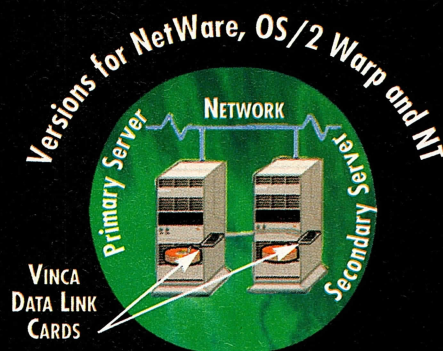
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using a settings choice on the menu, which you get with the click of the right mouse button. This gives you the familiar OS/2 Warp settings book, which you fill in.

A number of features show considerable thought into how users interact with computers. One striking example is the Personally Safe n' Sound backup utility. It uses a plumbing metaphor to let you choose how the backup or the restore will take place and then **simulates** the process through a number of filters and estimators before you do anything irrevocable. It's fast and easy to use, the design is a model of clarity, and we found it easy to start creating backups just for fun. Any product that makes backups fun deserves a god-like position in the computing hall of fame.

With that kind of glowing praise, it may seem churlish to note that when Personally Safe n' Sound made its time estimates, they were dramatically wrong. Part of this may have occurred because we were using a network-based target on another server. The fact remains, however, that the backup of the OS/2 Warp Server portion that we'd installed was estimated to be an hour and 10 minutes, while the actual backup took something like four minutes (things happen fast with switched 100Mbit/sec Ethernet). While we can understand overestimating the time because the software might not realize it was on a fast network, even traditional Ethernet only took about eight minutes for the backup when we tried it over a more normal path. Since the backup software knew we were using a network device as a target, we wonder why it blew the estimate so badly.

Once you get past these glitches, though, OS/2 Warp Server is easy to use. Administrators will appreciate the fact that OS/2's multithreaded design makes running a number of network monitoring functions at the same time both easy and effective. You can run backups, administer a domain, as well as work on user profiles at the same time and never miss a beat. While administering the domain with OS/2 Warp Server's tools isn't easy, it's still a complete solution. You can control resource allocation, user details, and software licensing easily.

OS/2 Warp Server also performs

well, although it's not going to knock Novell off the top in terms of sheer throughput. We found in a series of pure data throughput tests using files ranging from 30 to 160MB in size, that OS/2 Warp Server was in the mid-range between NetWare and Windows NT. We used 100Mbit/sec switched 100 Base-T Fast Ethernet as the transport when doing this so that we could eliminate other bottlenecks. We compared an identically configured Windows NT Server and the OS/2 Warp Server used in this review. The Windows NT Server was optimized for file and print sharing. The Novell NetWare 3.12 server used in this informal comparison was not specifically optimized but was significantly faster.

On the other hand, OS/2 Warp Server handles networked applications very smoothly. The support for IPX, TCP/IP, and NetBIOS means that virtually any application server you want to use will work on your network. The ability to interact with the main Microsoft desktop operating systems (we tried Windows NT Workstation 3.51 and 4.0 prerelease, Windows 95, and Windows for Workgroups 3.11) means that OS/2 Warp Server should be at home in nearly any enterprise environment. Administrators can put OS/2 Warp Server in place without worrying about compatibility issues.

Making choices

The problem with OS/2 Warp Server isn't whether it's a good server. It is. The problem is whether users can find out. Unless IBM fixes the major problems we found, the chances are good that users can't.

Unfortunately, IBM's development staff has missed a couple of major items, and a couple more smaller items. The major items, including the problems with disk formatting and with the parameter setting for the server, are sufficiently serious that they can keep the operating system from working at all. Despite the fact that we've been running LAN Server for years and run a fully equipped network testing lab, we couldn't have made OS/2 Warp Server run without assistance from IBM's engineering staff.

Because most users don't have the resources to call on IBM engineers, these problems would probably result

in a quick call to the vendor and a swap to Windows NT. This is unfortunate, because OS/2 Warp Server is the most serious competition that Windows NT Server is likely to have.

In its current form, we can't recommend the initial release of OS/2 Warp Server to anyone except experienced users of IBM LAN Server. If you want to move to OS/2 Warp Server, then make sure you have the services of an experienced consultant already arranged. If you can wait, then it's probably a good idea to see if IBM fixes these serious problems before you move. Right now, OS/2 Warp Server is good, but it's not quite ready for prime time.

OS/2

Wayne Rash, Jr. is a contributing editor and columnist for Communications Week. He's based in Washington D.C. and edits technology sections for The Washington Post. He can be reached at CompuServe 72205,221 or Internet wrash@interamp.com.

Resources:

OS/2 Warp Server 4.0 (\$629)

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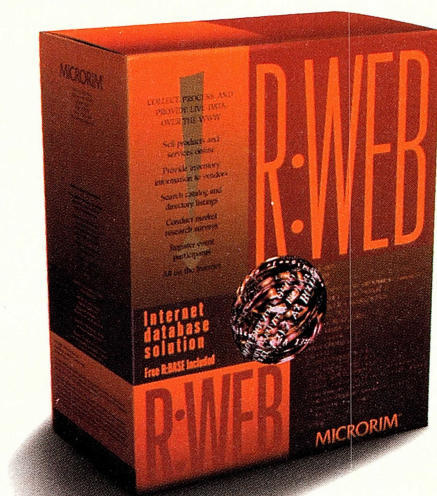
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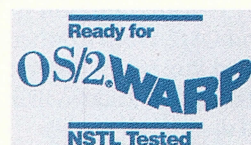
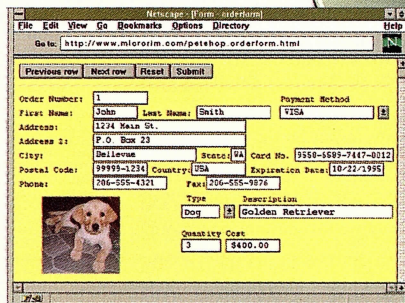
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Installing OS/2 Warp, To Go

Overcoming common portable-computing annoyances. **By Lenny Bailes**

Most OS/2 Warp laptop users would rather fight than switch—if only they could load the operating system. Although OS/2's well-earned reputation for difficult installations has improved with the release of OS/2 Warp Connect, it seems that laptops, with their strange display chips—PC Card (PC-MCIA adapters) and other specialized hardware—are still a challenge. Perhaps OS/2 won't recognize the CD-ROM drive, or, to add insult to injury, you might endure the ordeal of a disk installation only to discover that your PC Cards don't work.

A call to your notebook vendor for help often produces the following response: "OS/2? Stick with the copy of Windows that we preloaded for you."

The good news is that, with a little foreknowledge and patience, these obstacles can be overcome. You can easily make OS/2 Warp functional on notebooks from Toshiba, WinBook, and other companies that don't offer explicit support. Let's look at some of the most common problems and the solutions that solve most of them. Keep in mind that these problems aren't limited to laptops; these solutions might work on desktop systems as well.

Can't install from your CD-ROM drive?

You know the drive is there, even if OS/2 Warp can't find it. It worked under DOS and Windows, so what's going wrong?

CD-ROM recognition problems can be subdivided into categories corresponding to the three major drive types: IDE, proprietary interfaces, and SCSI. Additional issues arise on notebook computers, where PC Card (as PCMCIA has been renamed) socket services must be installed before device drivers for a CD controller can be activated.

Let's take a look at the most commonly reported solutions to the CD-ROM problem.

Problem: Original OS/2 Warp Red Box doesn't recognize IDE CD-ROM drives. IDE CD-ROM drives are becoming increasingly popular in both desktop machines and notebook docking stations. OS/2 Warp's IDE device driver is programmed to recognize secondary controllers and hardware IRQs, so that an IDE CD-ROM drive can be found with little difficulty. This recognition is in OS/2 Warp Blue Box (Full Pack) and OS/2 Warp Connect. But alas, the original OS/2 Warp's Red Box (for Windows) contains no support for the ATAPI standard that allows IDE CD-ROM units to coexist with IDE hard drives.

IBM solved this problem in its OS/2 Warp FixPak 5 and in all subsequent versions of OS/2 Warp. But this fact is of little

comfort to a classic OS/2 Warp user who can't get the boxed version to find the installation CD-ROM.

Fortunately, OS/2 Warp 3.0 Red Box users don't have to download and unpack megabytes of service pack files to resolve the problem. A 65K file called *atapi1.zip* is available on the IBM BBS and at IBM's FTP site. This archive contains updated versions of four files: *ibm1s506.add*, *ibmidecd.flt*, *os2cdrom.dmd*, and *os2dasd.dmd*. To get the original OS/2 Warp to recognize an IDE CD-ROM controller, use the following procedure:

- Obtain the *atapi1.zip* replacement drivers and unpack the ZIP archive to a spare directory on your hard disk. (If you don't have a working version of OS/2 currently installed, then use DOS and a DOS telecommunication package.)
- Make a copy of the second OS/2 Warp Installation Disk for CD-ROM. (Oddly, this disk has a big numeral 1 on the label.) Put the copied disk into drive *a:* and copy the four file replacements onto it from your hard drive.

Dual-Port EIDE Systems Can't Find Drives 3 and 4

Some newer computer systems include dual-port EIDE support directly on the motherboard. However, a number of slightly older systems are driven by 32-bit VESA controller cards. These cards typically permit you to attach a third and fourth hard disk (or CD-ROM drive) to the second controller port. But, alas, the second port is not activated until you load a DOS device driver in a DOS *config.sys*. OS/2 users with such systems have no way to recognize devices attached to the second port on a cold boot.

One solution to this problem is to replace the dual-ported (four-drive) controller card with two single-ported (two-drive) cards that OS/2 can recognize individually. (The jumpers on the second card must be configured to use both the secondary IRQ [15] and the secondary port address [170].)

A workaround for dual-ported cards requires that your system have the capacity to dual-boot DOS and OS/2. It turns out that the second port on a dual-port controller card will usually remain active after a warm boot, even though its DOS device driver is no longer in memory. So if you cold boot to DOS and the controller device is loaded, you can then warm boot to OS/2 (using either the Dual Boot option or Boot Manager). The *ibm1s506.add* driver will recognize the second port on a warm boot, allowing you access to drives 3 and 4, or to an IDE CD-ROM.

- You may need to delete a file or two from the installation disk in order to make room. (If you have an IDE CD-ROM drive, good candidates for deletion are the drivers for SCSI cards: *aic7770.add* and *aic7870.add* (if you don't have an ADAPTEC card) or *fd8xx.add* (if you don't have a Future Domain card).)
- Insert the first Installation Disk for CD-ROM in drive *a:* (the one that doesn't have the numeral 1 on the label) and reboot the machine. When prompted for the second disk, insert the copy of Disk 1 that you've just made. This time, OS/2 Warp should find your IDE CD-ROM drive and let you run a trouble-free installation.

If the CD-ROM drive still eludes OS/2 Warp, check your hardware configuration to determine whether the CD-ROM is the slave drive on the first controller port, the master drive on the second controller port, or the slave drive on the second controller port. Boot DOS and edit the *config.sys* file on the copy of the second disk. Locate the line that reads **BASEDEV=IBM1S506.ADD** and add one of the following commands:

```
/A:0 /U:1 /ATAPI for slave drive on first controller port
/A:1 /U:0 /ATAPI for master drive on the second controller port
/A:1 /U:1 /ATAPI for slave drive on the second controller port
```

For example, you might make the line read:

```
BASEDEV=IBM1S506.ADD /A:1 /U:0 /ATAPI
```

If you've previously done some fooling around with the *config.sys*, make sure that the following two statements are still present (in sequential order):

```
BASEDEV=IBMIDECD.FLT
DEVICE=OS2CDROM.DMD
```

Problem: OS/2 Warp doesn't recognize proprietary CD-ROM drives. If your computer contains a proprietary sound card/CD-ROM package from a multimedia vendor, the drive type is probably neither IDE or SCSI. The controller cards for such systems typically use a proprietary interface manufactured by Panasonic, Sony, Hitachi, or Mitsubishi. The CD-ROM drive can be from an entirely different manufacturer.

Out of the box, all versions of OS/2 Warp support a number of these interfaces (more than either Windows 95 or Windows NT), but some of them won't be recognized automatically on the first installation attempt.

Usually, the key is to determine the particular driver on the installation disk that corresponds to the proprietary interface, then append command line switches containing the correct IRQ and port address. It's often the case that the first several letters of the file name on the installation disk correspond to the CD-ROM drive type. (For example: *sony535.add* and *mitfx001.add*.) All of the drivers use the extension *.add*. If you examine these files in a viewer capable of displaying hex code, you'll see that the CD-ROM drives they support usually appear within the first few lines of code.

You might be able to discover the port address and IRQ used by the CD-ROM by booting the system into DOS. Watch the status reports echoed by the DOS device drivers in *config.sys*. The IRQ will be a number between 2 and 15, and the port address will be a three-digit number between 100 and 400. If this information isn't apparent in the DOS *config.sys*, you may need to open the computer (not recommended for laptops!) and examine the jumpers on the controller card or contact the vendor.

Once you've identified (or downloaded) the device driver that corresponds to your CD controller and know the port and IRQ information, you can append this information to the *config.sys* file located on OS/2 Warp Installation Disk 1.

For example, assume your CD-ROM drive is a Sony CDU33A, and you've determined that it uses the *sony31a.add* driver. OS/2 Warp didn't recognize the drive on the first try, but under DOS you've determined that it uses IRQ 5 and Port Address 230h. Insert OS/2 Warp Installation Disk 1 in drive *a:*, open *config.sys* in a text editor, and add the line:

```
BASEDEV=SONY31.ADD /A:0 /P:230 /I:5
```

The **A** stands for adapter number (if this is the second CD-ROM drive in your system, you would use */a:1*). The **P** is the port address, and **I** is the interrupt number.

Another example: You have a Creative Labs SoundBlaster 16 card with a triple interface (Sony, Panasonic, or Mitsubishi) and a Teac CD55A CD-ROM drive. The port address under DOS is 220, and the IRQ is 7. Although it works fine under DOS, you've discovered that the default OS/2 Creative Labs driver (*sbcd2.add*) doesn't work with OS/2, even when you append the correct port address and IRQ.

The TEAC BBS, which you've called in desperation, contains the file *cd55aos2.zip* with an OS/2 driver called *teac-cd1.add*. Unpack the file, copy *teaccd1.add* to Installation Disk 1, and add the following statement to its *config.sys*:

```
BASEDEV=TEACCD1.ADD /P:220 /I:5.
```

Now, OS/2 Warp will find the drive and let you proceed with the installation.

Problem: OS/2 Warp doesn't recognize SCSI CD-ROM drives. SCSI CD-ROM drives generally work transparently under all versions of OS/2 Warp, provided that IBM has included drivers for them in the basic package. If you have an unsupported SCSI controller, the chances are good that the manufacturer offers a vendor-written OS/2 device driver. If you don't have the driver on an OEM disk, the best strategies to obtain the driver (in order) are:

- Check the vendor's BBS for drivers.
- Log on to CompuServe, *GO IBMFF* and enter the vendor's name and the word "OS/2" in the file-finding search engine.
- Call the IBM Support Bulletin Board and search for the driver by vendor name or the card's model number.
- Post a query to an OS/2 forum on CompuServe or the Internet, asking whether any other users have been able to get this SCSI card to work.

If a driver is available for your card, it will generally be a file of 16 to 50K in size that ends with the suffix *.add*. For example, if your SCSI card is an NCR model that uses a driver called *os2cam.add*, delete *aic7770.add* and *aic7870.add* to make room on your copy of CD-ROM Installation Disk 1. (Don't delete files from the original!) Copy the *os2cam.add* driver that you've obtained to the disk, open *config.sys* in a text editor, and add the following statements:

```
BASEDEV=OS2CAM.ADD /v
SET COPYFROMFLOPPY=1
```

The second statement ensures that the device driver you've copied to the floppy disk will be transferred to your hard disk for the final phase of the installation process.

Problem: OS/2 Warp doesn't recognize PC Card-based SCSI devices.

If your notebook has a CD-ROM drive attached to a PC Card, you've probably been told that you must install OS/2 Warp from disks. The reason given: The CD-ROM drive can't be seen until you install OS/2 Socket Services, and OS/2 Socket Services aren't installed until after the operating system is copied to your hard disk. However, you can probably spare yourself the ordeal of a floppy installation; you'll need a modem and the capability to dial out to a BBS from DOS to download a few drivers.

To resolve OS/2 Warp's Catch-22 scenario with socket services, download a file called *os2pcm.zip* from the IBM Bulletin Board, CompuServe, or the IBM FTP site. At this writing, the file contains PC Card and Socket Service drivers for OS/2 2.11. Surprisingly, no one yet has posted a set of OS/2 Warp PCMCIA drivers to these information sites, but we're working on remedying that situation. In the meantime, the OS/2 2.11 set should be compatible enough to recognize your CD-ROM drive for an initial install. After OS/2 Warp is on your hard disk, you can update socket services through the Selective Install object in the **System Setup** folder.

To install OS/2 Socket Services for an initial install, copy the *pcmcia.sys* file to Disk for CD-ROM 1 and add a **BASEDEV** statement to it. You must also copy the appropriate Socket Services driver to this disk and add a statement for it in *config.sys*. Table 1 shows a list of

Table 1: Socket Services Device drivers and chipsets for PC Card-based devices.

Notebook System	SS Device Driver	Chipset
Ambra 486 SN425C	IBM2AMB1.SYS	Databook
AST Ascentia 800N	IBM2AST1.SYS	Intel
AST Bravo	IBM2AST1.SYS	Intel
AST PowerExec	IBM2AST1.SYS	Intel
Austin DSTN	IBM2CAD1.SYS	Databook
Compaq Concerto	IBM2CMQ1.SYS	Cirrus Logic
Compuadd 425TX	IBM2CAD1.SYS	Databook
Dell Latitude	IBM2MAT1.SYS	Cirrus Logic
IBM Thinkpad 350	IBM2SS01.SYS	Intel
IBM Thinkpad 360	IBM2SS01.SYS	Ricoh
IBM Thinkpad 500	IBM2SS01.SYS	Intel
IBM Thinkpad 510	IBM2SS01.SYS	Intel
IBM Thinkpad 720	IBM2SS02.SYS	IBM
IBM Thinkpad 750	IBM2SS01.SYS	IBM
IBM Thinkpad 755	IBM2SS01.SYS	Ricoh
IBM PS/2 E	IBM2SS01.SYS	IBM
Matsushita	IBM2MAT1.SYS	Cirrus Logic
NCR Safari	IBM2NCR1.SYS	Intel
NEC Versa	IBM2NEC1.SYS	Intel/Cirrus
Panasonic	IBM2MAT1.SYS	Cirrus Logic
Toshiba T3600	IBM2TOS1.SYS	Toshiba
Toshiba T4500	IBM2TOS1.SYS	Toshiba
Toshiba T4600	IBM2TOS1.SYS	Toshiba
Toshiba T4700	IBM2TOS1.SYS	Toshiba
Toshiba T4800	IBM2TOS1.SYS	Toshiba
Zeos	IBM2ZEN1.SYS	Intel
Zenith Z-lite 425	IBM2ZEN1.SYS	Intel

(Courtesy of David Moskowitz's OS/2 Warp Unleashed, Sams Publishing, 1994)

supported notebook systems in OS/2 Warp, with their corresponding drivers and chipsets.

Socket drivers for some other notebook systems are available as ZIP files on the IBM bulletin board. If you have Internet access, you can check the Web page for PCMTABLE magazine (<http://cyniska.ubishops.ca/os2/resources/hardware/pcmtable.2.0051.html>) for more late-breaking information on available drivers for notebooks.

Many notebooks that don't appear on the official list are still compatible with OS/2 Socket Services, because they use one of the six supported chipsets. Later models from vendors such as AST, IBM, NEC, and Toshiba can often use drivers associated with earlier models. The Toshiba and Intel chipsets are used by other companies. For now, let's assume you know which one your system uses. (If uncertain, ask your vendor.)

For an example, let's look at a WinBook XP Notebook. The machine ships

with an optional PC Card for SCSI, known as the New Media Bus Toaster. Neither WinBook nor New Media actively support OS/2, and no mention of OS/2 is in the documentation provided by the vendor.

However, WinBook Computing can tell you that the system uses the Toshiba chipset for its socket services. A quick search of the IBM bulletin board reveals a file called *btos2.zip*, which contains an OS/2 Bus Toaster driver. You can successfully install OS/2 Warp from the CD-ROM onto a WinBook XP by making the following preparations:

- Back up Installation Disk 1 and make room on it for new files by deleting *aic7770.add* and *aic7870.add*.
- Download and unpack *os2pcm.zip* and *btos2.zip* under DOS from the IBM Bulletin Board and copy the files *pcmcia.sys*, *ibm2tos1.sys*, and *btos2.add* to Installation Disk 1.
- Add the following statements to the

Advanced Editor

config.sys on the copy of Installation Disk 1:

```
SET COPYFROMFLOPPY=1
BASEDEV=PCMCIA.SYS
BASEDEV=IBM2TOS1.SYS
    /S0=2/C0=10
BASEDEV=BTOS2.ADD
```

(Note: To avoid creating a conflict in *config.sys*, you may need to comment out other lines that load superfluous SCSI drivers. With the New Media Bus Toaster, you should at least remove the Adaptec SCSI driver, *aha152.add*—not only is it not needed, but it'll cause the system to hang.)

- Insert the other IBM installation disk in drive *a:* and reboot the system. To see what's going on, press <Alt+F2> when the small square appears in the upper-left corner of the screen. The load status of each device driver will appear at the bottom of the screen.

With this setup, a SCSI CD-ROM drive attached to the Bus Toaster should be recognized by the Warp installation program. Once OS/2 is up and running,

you should open Selective Install to refresh PCMCIA support. (For the WinBook system, you should choose the Toshiba T3600 chipset.) This step will allow OS/2 Warp to overwrite the borrowed OS/2 2.11 drivers with current versions of *pcmcia.sys* and *ibm2tos1.sys*. (Hopefully, by the time you're reading this article, you'll find a set of current OS/2 Warp socket service drivers available on the IBM BBS, obviating the need for this final step.)

Problem: coping with PC Card command line switches. Some readers might have noticed that some command line parameters were appended to the **BASEDEV=IBMTOS1.SYS** statement previously used. The **S0** parameter defines how many PCMCIA slots are active for the first PC Card adapter—in this case, two. The **C0** statement defines the IRQ that will be used to control OS/2 Socket Services. In the example (**C0=10**), we explicitly assigned IRQ 10. For all versions of OS/2, up to and including the Blue Box Full Pack, the default IRQ assigned to socket services is 15. This number is not the best IRQ to choose,

because it can conflict with a second IDE controller on your system (which may be connected to an IDE CD-ROM drive).

IBM became aware of this problem after the first Red Box version of OS/2 Warp was issued. (Users with IDE CD-ROM drives reported that once PCMCIA services were installed, the CD-ROM drive disappeared.) All versions of *pcmcia.sys* issued after 1/15/95 (including FixPak updates) include a new option for managing socket services by polling instead of through interrupts. If you're using a version of *pcmcia.sys* dated later than 1/15/95, you can append the parameter **/p** to its command line. This change overrides any IRQ instruction specified on the device line for the Socket Services driver. In other words, if your boot disk (or boot drive after installation) contains a current copy of *pcmcia.sys*, you can add the **/p** parameter to its device line to eliminate IRQ conflicts with IDE or SCSI controllers. **OS/2**

Lenny Bailes is a technology writer based in San Francisco, CA. You can contact Lenny at 70713.562@compuserve.com.

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Extending the Enhanced Editor

Adding REXX functionality to EPM. By Bill Schindler

Last month, in "Learning the Enhanced Editor" (p. 34), we introduced IBM's Enhanced Editor (EPM) and showed how to make it more useful by tweaking its settings. After you use EPM for a while, you may begin to get the sense that a lot of power is buried behind its menus and rather cryptic help. In this article, I'll try to point you to some powerful features, especially, though not solely, for programmers.

EPM can be given additional functionality using either REXX or the EPM macro language, named E. Most of EPM's basic functions are written in E, and the macro source is available for the cost of downloading from the Internet or CompuServe. All of the EPM extensions discussed in this article are either freeware or IBM Employee Written Software. See the Resources section for the location of all the files mentioned in this article.

When you download extensions, also pick up a copy of the EPM macro sources (*epmmac.zip*) and the EPM macro compiler ETPM (one of the files inside *epmapp.zip*). You may not intend to write your own macros, but if you want to change defaults that aren't accessible from the menu, or if you want to turn on (or off) some built-in functionality, then you'll need the sources and compiler.

Changing and rebuilding EPM is a fairly simple process. Most of the changes you'll make are settings in the file *myncf.e*. You'll have to create *myncf.e*—you can look at *os2tools.cfg* (included with the EPM macro sources) for a good starting point.

Using EPM extensions

Extensions for the Enhanced Editor require one of three different methods to use them.

- A set of EPM macros written in E may require you to add an **include** line in *mystuff.e* or *mykeys.e* and then recompile EPM.
- The macros may also come precompiled, so that you can invoke them using EPM's **LINK** command.
- They may be in the form of REXX programs, which are executed using EPM's **RX** command.

Most of the available freeware macro packages include the source code. Usually

the packages also include compiled macros, but the compiled macros are often **designed** for an earlier version of EPM. Thus, if you plan to use any of the extensions listed here, you should acquire both the EPM macro source and the EPM macro compiler.

To recompile the base EPM macros, you'll need to compile—that is, turn into executable form—both *epm.e* and *extra.e*. These two files include all the other macro files needed to build EPM. Compiling a macro is done by simply running the compiler on the file, using the OS/2 command **etpm extra** (once you've downloaded ETPM, of course).

The result of this command would be the file *extra.ex*, which is the compiled macro. To load and run the newly compiled EPM macros, copy them to a directory on the EPM-PATH (usually *c:\os2\apps*), shut down any running copies of EPM, and then open EPM again.

If the macro is designed to be linked rather than compiled into the base macros, invoke it by opening the EPM command dialog. Press <Ctrl+I> and enter the command **link macro-name**, where **macro-name** is the name of the macro you want to use. Most linked macros add or replace keystrokes or add a new pull-down menu to the menu bar.

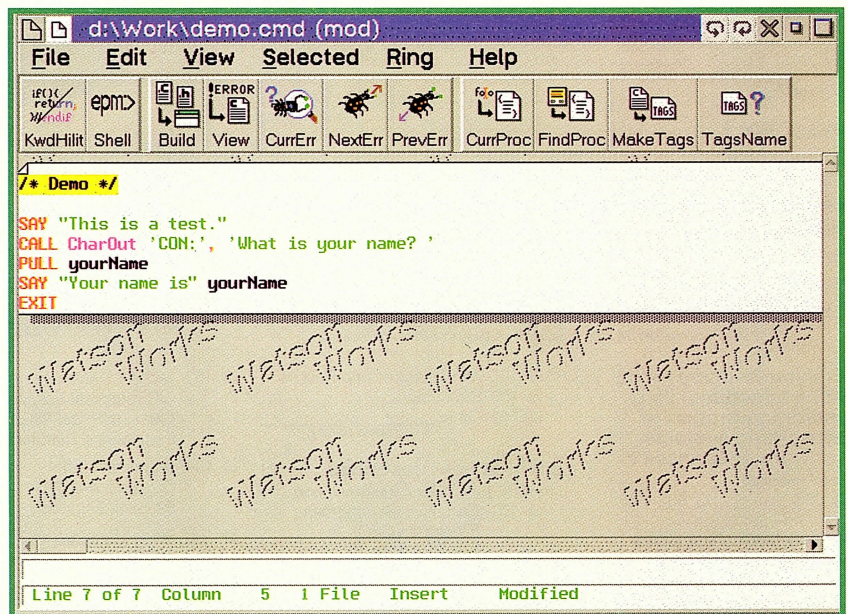


Figure 1: The Enhanced Editor 6.03 adds a toolbar, graphical background, and keyboard highlighting.

EPM REXX macros are run by opening the EPM command dialog with <Ctrl+I> and entering the command **rx macro-name**.

Syntax expansion

The built-in syntax expansion works by generating most of the code for a construct like **if** or **while**. For example, in a C file with syntax expansion turned on, when you press the spacebar after typing **if**, EPM will automatically generate:

```
if ( ) {  
  
}  
  
else {  
  
}
```

EPM has built-in syntax support for C, C++, REXX, Pascal, and its own E language. You can turn on syntax expansion for any supported language (EPM checks the file extension to determine the language) by opening the command dialog <Ctrl+I> and entering "expand on." The version of EPM included with OS/2 Warp has syntax expansion turned on by default.

If you want to fine tune the syntax expansion support, you'll need to perform some minor edits on the macro sources and then recompile the EPM macros. Table 1 shows flags that control syntax expansion for each language supported by EPM. Flags that use either a 0 or 1 are simple switches; 0 turns

it off, and 1 turns it on. Table 1's switches beginning with **C_** are for C and C++. You have similar switches for other languages, too: For REXX, the names begin with **REXX_**; for Pascal, they begin with **P_** and for E the names begin with **E_**.

Experienced programmers want often to change EPM's expansion more than Table 1's simple flags allow. If you look through the EPM macro source, you'll discover that adding more code templates or defining abbreviations can require a lot of work on your part.

So, why not do it

Load Files Any Time

One of my favorite extensions for EPM is the **Alt_1** macro. Out of the box, EPM uses the <Alt+1> key combination to load a file from a **DIR** listing. The **Alt_1** macro extends <Alt+1>'s function to work almost anywhere that you might find a file name.

For example, if you're editing a C file, you can position the cursor on a **#include** line, press <Alt+1>, and EPM will search for and load the file using C's **include** path. The **Alt_1** macro also recognizes the error output of several compilers. You can compile a file in EPM's shell and then go directly to the line and column in the file of any errors by pressing <Alt+1>.

Alt_1 can be used as a stand-alone, linkable extension, or it can be included in *mykeys.e* and compiled as part of the base EPM macros. You can find the **Alt_1** macro in the *epmsmp.zip* file. This macro collection includes other useful utilities that do everything from global search and replace to balancing parentheses to implementing a reverse polish calculator.

the easy way, with the freeware EPMASI macro package, instead of writing it yourself.

The benefit of using EPMASI over the built-in syntax expansion is that you can easily change the format of the generated expansion. You can also define new expansions or create a set of definitions for an unsupported programming language without learning the E macro language.

The EPMASI macro package (*epmasi.zip*) extends EPM so that you use <Alt+H> to perform syntax expansion. The EPMASI package uses a text file to define abbreviations with the expansion for that abbreviation. Several abbreviations can be associated with a single expansion.

To reduce confusion, you should turn off EPM's built-in syntax expansion if you plan on using the EPMASI package.

EPM REXX macros

EPM may well offer the most extensive REXX macro support of any OS/2 application. From a REXX macro, you can open and close files, modify the menus, define actions for keys and the mouse, execute EPM commands, as well as insert, delete, and replace text.

One of the most common EPM REXX macros is *profile.ern*. The profile will be executed every time you start EPM, when

Table 1: Flags that control syntax expansion.

SYNTAX_ASSIST	0 or 1, 1 uses default value for syntax expansion for all supported languages
C_SYNTAX_ASSIST	0 or 1, 1 turns C and C++ syntax expansion on or off
C_TABS	0 (use default tabs) or the number of spaces to indent
C_MARGINS	0 (use default margins) or the margins (see help for the MARGINS command for information on the settings for margins)
Additional values used by C and C++ are:	
I_like_my_cases_ under_my_switch	0 or 1, 1 lines case labels up with the switch statement
I_like_a_semicolon_ supplied_after_default	0 or 1, 1 puts a semicolon following the default label in a switch statement
ADD_BREAK_AFTER_DEFAULT	0 or 1, 1 places a break statement following the default label in a switch statement
WANT_BRACE_ BELOW_STATEMENT	0 or 1, 1 puts the brace below the statement rather than on the same line
WANT_BRACE_BELOW_ STATEMENT_INDENTED	0 or 1, 1 places the brace below the statement and indents it
USE_ANSI_C_NOTATION	0 or 1, 1 uses ANSI C notation rather than K&R notation
TERMINATE_COMMENTS	0 or 1, 1 tell EPM to automatically terminate comments
C_KEYWORD_HIGHLIGHTING	0 or 1, 1 activates keyword highlighting (EPM 6.x only)
WANT_END_COMMENTED	0 or 1, 1 adds a comment after a closing brace

Customized EPM

The CustEPM package is a fully customized version of the EPM macros. It adds a new menu item to the menu bar, makes some EPM commands easier to use, and adds several new functions.

Some of the functions supplied by this package include searching across multiple files, creating comment boxes around a block mark, simple line draw functions, and the ability to "fold" functions (that is, hide the code inside of a function).

Unfortunately, I couldn't find a copy of *cstepm.zip* that contained compiled macros that are compatible with the current version of EPM. If you want to use CustEPM, plan on recompiling the package. If you want to use CustEPM with EPM 6.x, compile the package separately rather than including it in your *mycnf.e* file.

you turn profile support on in it, making the profile a good place to set start-up parameters, change directories, and so on.

For example, if you want syntax expansion always turned off, you could

create a *profile.ern* that contains the following lines:

```
/* profile.ern */
'expand off'
```

Save the file in a directory on the EPM PATH (usually *c:\os2\apps*). Then open EPM's command dialog with <Ctrl+I> and enter the command **profile on**. Select **Options**, then **Save options** from the menu. The next time you start EPM, syntax expansion will be automatically turned off.

Most of the available freeware EPM REXX macros are contained in the *epm-rer.zip* collection. Most of the files in *epm-rer* are intended to be examples rather than useful macros. However, you may find that one of the examples, the tic-tac-toe macro *tictac.ern*, gives you a whole toolbox of EPM tricks (and a semihumorous implementation of tic-tac-toe, to boot).

Visual development tools for REXX like Hockware's VisPro/REXX and Watcom's VX/REXX can also generate REXX macros that are useable with EPM. The combination of visual REXX

Hypertext Markup Language

If you need to occasionally create a page for a World Wide Web site, you should find the **HTMLTAG** macro, written in REXX, to be a real time saver. When you link HTMLTAG, it adds a pull-down menu to the menu bar that gives you access to all of its functions.

HTMLTAG lets you create an HTML document skeleton from a single menu selection. It lets you easily tag paragraphs, lists, and headings. You can also add references to graphics by dragging and dropping the graphic at the location you want the reference inserted.

with EPM lets you build some extremely powerful macros.

Just beginning

Naturally, this is just the beginning. The Enhanced Editor is a powerful editor at a price that can't be beat. Extensions are easy to add and creating your own isn't difficult. With very little

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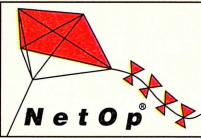
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The Latest Version: EPM 6.03

The newest version of the Enhanced Editor offers a variety of new features. It's now a full 32-bit application with right mouse button menus, an optional bitmap background, a redesigned menu structure, and faster start up.

You can find EPM 6.03 on the Internet at <ftp://hobbes.nmsu.edu/os2/editors/epm603.zip>. Also, IBM's Developers Connection CD-ROM usually has the latest version of EPM (DevCon 8 has version 6.02 in the `editors\epmbeta` directory).

This version offers an improved user interface along with a host of new features. Here are some of the more significant enhancements (Figure 1):

Toolbar. A user configurable toolbar is now a standard part of EPM. You can set up and load different toolbars, and you can resize the toolbar so that it's icon-only, icon and text, or text-only.

Extended GREP. The regular expression-based search and replace has been expanded and now includes the ability to include subexpressions in the replacement string.

Long text lines. Text lines can now be up to 1,600 characters long. If a text line exceeds the limit, EPM splits the line and remembers that the line was split. When you save the file, EPM will automatically paste split lines back together.

Context (right mouse button) menus. The right mouse button now brings up a context-sensitive menu. The menu offers the most common actions that you would perform along with some functions that aren't easily accessible otherwise.

Improved help. The online help is vastly improved. Many of the functions that were undocumented in EPM 5.51 (the version included with OS/2 Warp) are now clearly documented.

Keyword highlighting. Color keyword highlighting for any programming language is now a built-in feature. You can modify the colors used and which words are highlighted by editing a text file.

effort, you can have an editor that works *your way*. I hope you enjoy exploring the possibilities! **OS/2**

Bill Schindler has used just about every editor, operating system, and computer lan-

guage available. He wrote Teach Yourself REXX in 21 Days and is currently working on a book about OpenDoc programming. Bill is editor of the Phoenix OS/2 Society's publication, Extended Attributes, a sysop in the CompuServe OS2AVEN and OS2BVEN forums, and (just to prove he has a real life) has won awards for his home-brewed beer.

Resources:

The base EPM files can be downloaded from the Internet at:

<ftp://hobbes.nmsu.edu/os2/ibm/epm>

<ftp://software.watson.ibm.com/pub/os2/epm>

CompuServe forum, OS2SUPPORT, library 23.

You can also find the base files on the Hobbes CD-ROM from Walnut Creek or the IBM Developer's Connection CD-ROM.

Other EPM macros and extensions can be found on the Hobbes CD-ROM, the Developers Connection CD-ROM, OS2USER on CompuServe, or on the Internet at <ftp://hobbes.nmsu.edu/os2/editors>.

For additional information on using the E macro language, read the two online information files found in `epmbk.zip`, which can be found in the same places as the base EPM files.

If you're interested in writing EPM REXX macros, see the `epmrex.zip` file (available from the same sources) file. Here's also a shameless plug for the Sams book *Teach Yourself REXX in 21 Days* by Bill Schindler and Esther Schindler. In that book, look at the chapter "Day 20: Extending OS/2 Applications," for information about EPM and REXX.

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Debugging REXX DLLs Written in C/C++

A do-it-yourself framework. By John Gillett and Norman Sheen

When REXX alone isn't enough, what do you do? Many programmers turn to REXX-aware Dynamic Load Libraries (DLLs), generally those provided by other applications like DB2/2. Although these DLLs, together with a growing number on bulletin boards and FTP sites, satisfy many requirements, you may need to write your own DLL; for example, to write a REXX interface to a C/C++ toolkit or to encapsulate in C/C++ an algorithm that is particularly processor-intensive.

Even though the writing of REXX-callable DLLs is well explained (see *OS/2 REXX: From Bark to Byte*), we have found nothing to help with the debugging process! And help is needed, because the test program that loads the DLL is a REXX script; however, the interactive source code debugger, IPMD, lets one debug only .exe files. In this article, we will demonstrate a simple workaround, allowing writers of REXX-callable DLLs to take full advantage of IPMD.

The basic process

Here is the eight-step technique that we evolved in order to debug a DLL providing a REXX interface to a telephony toolkit.

- Compile source code with the debug option set and link.
- Write a test script to load the Dynamic Load Library and invoke its functions.
- Start IPMD and specify *cmd.exe* as the program name.
- Set the name of the test DLL in IPMD's breakpoints list.
- Put IPMD into Run mode; hence, start the OS/2 session under the control of IPMD. Start the test script from the command line of this session.

- When the test script loads the test DLL IPMD, an event breakpoint occurs. With the DLL loaded, IPMD lets you set breakpoints in the source code.
- Step through a test script and trigger the DLL breakpoint.
- Step through the DLL source code.

Let's work through a this process in more detail.

Listing 1: The NMAKE file used to build the DLL.

```
# NMAKE file  VLIB.MAK
#
# - uses CSET/2 and LINK386
# - /DE required when debugging

vlib.dll: vlib.obj vlib.def
    LINK386 /DE vlib.obj, vlib.dll, \
    REXX+c:\dialogic\lib\voxlib+e:\toolkit\lib\rxstring, vlib.def

#
# /Ti+ option generates C debug information
#
vlib.obj: vlib.cpp
    icc /C /Ge- /Ls+ /Fb /Ti+ /IC:\dialogic\lib vlib.cpp
```

Listing 2: The REXX script to load the DLL and invoke test function.

```
/* test.cmd */
arg line

trace ?a

if RxFuncQuery('vlib') then
    rc = RxFuncAdd('VLoadFuncs', 'vlib', 'VLoadFuncs')

rc = VLoadFuncs()

rc = VLPickup(line)

rc = VHangup(line)

rc = VLWait_for_Call(line, '1', '0')

rc = VLClear_Tones(line)

etc.
```


Debugging REXX

Sample session

In this sample session, we show how to debug a telephony DLL that's provided as part of our Dialogic development toolkit.

Step 1: Compile source code with the debug option set and link. The syntax for NMAKE is simple: NMAKE VLIB.MAK. To prepare for debugging, set the debug option in both the compile and link steps that build your DLL.

Listing 1 shows the NMAKE file, *vlib.mak*, that we used to build our DLL. Note the inclusion of the /Ti+ option for the compiler and /DE option for the linker. These options are required to make the source code available to the symbolic debugger, IPMD, and should be removed when building the production DLL.

Step 2: Write a test script. Listing 2 shows a REXX script that will load our DLL and invoke the *VIHangup* function, the function to be debugged. With the DLL compiled and linked using the debug options, we are ready to use IPMD.

Step 3: Start IPMD and specify *cmd.exe* as the program name. At this stage, you may invoke IPMD using your preferred method, be it from an OS/2 command line, clicking on the PM Debugger icon from the C/C++ Tools folder, or from WorkFrame/2.

In the Debug Session Control, select the **Startup** item under the **File** menu. In the program entry field, type the name of the command processor, *cmd.exe*, and click on **ok** (Figure 1).

IPMD brings up a number of panels, and Figure 2 shows a typical layout.

Step 4: Name the DLL in the breakpoints list. In the Debug Session Control panel, select the **Load Occurrence** item under the **Breakpoints** menu.

This will display the Breakpoints Settings page (Figure 3). Enter the name of the DLL (or if you prefer, browse through the file list), and click on **ok**.

Step 5: Put IPMD into Run mode; hence, start the OS/2 session under the control of IPMD. Start the test script from the command line of this session. From the Debug Session Control panel, select the **Run** item under the aptly named **Run** menu. Or, if you're more mouse-oriented, press the green button on the DOSCALLS disassembly panel. Bring the window labeled "debug Appl-CMD.EXE" to the foreground and start the test script, for example, by typing "test." Step through the test script as shown in Figure 4.

When the test script loads the DLL (*VIloadFuncs*) in our example), IPMD

pops up an information box, which says that the breakpoint caused the program to stop. Click on the **ok** button to remove the box.

Step 6: Set Breakpoints in the DLL source code. Return to the Debug Session Control panel and click on the + in the components column. This will bring up the list of entry points within the DLL (Figure 5). Double-click on the name of a function, *VIHangUp* in our example, to display the source code listing (Figure 6). Double-click on a line number at a point where you want to

start debugging. In our case, we have instructed IPMD to stop at the first line of the *VIHangUp* routine. The number turns red to indicate that a breakpoint has been set.

Set further breakpoints as required.

Step 7: Step through script to trigger breakpoint. Switch to the Debug Session Control panel and select the **Run** item under the **Run** menu again to restart the

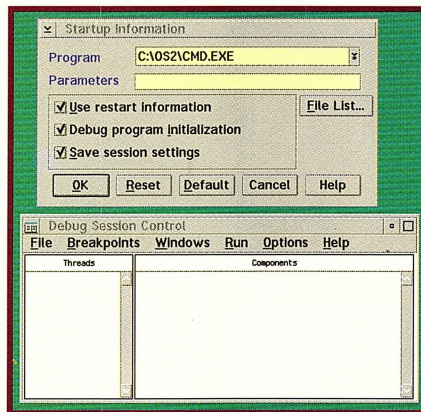


Figure 1: Startup information.

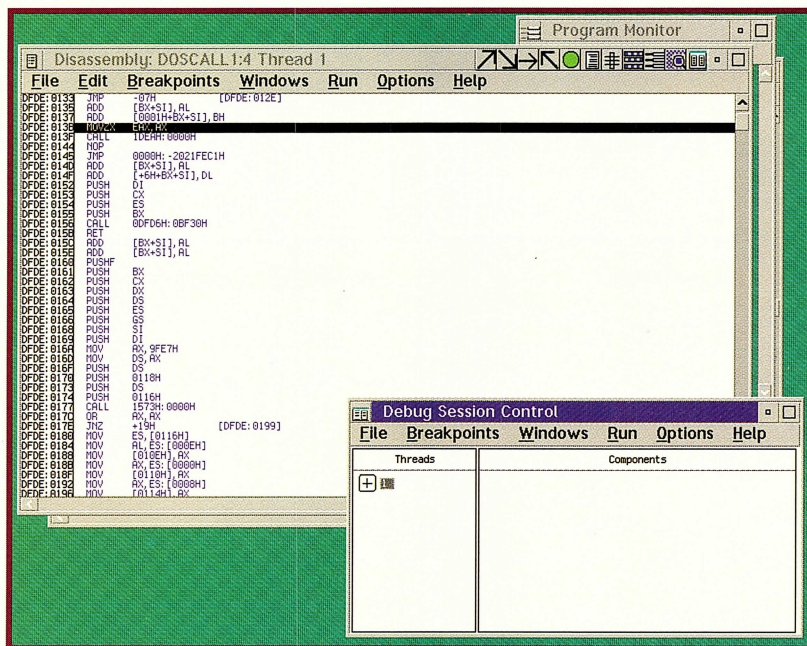


Figure 2: Preparing to set DLL breakpoints.

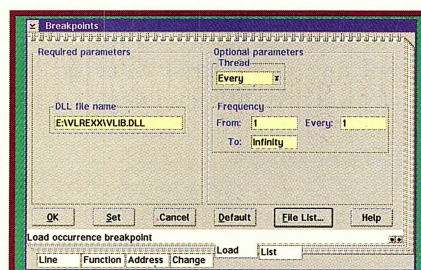


Figure 3: Setting name of DLL in breakpoint list.

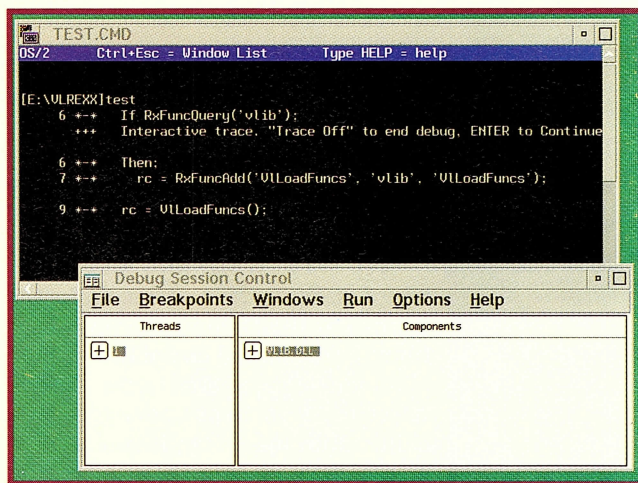


Figure 4: Invoking the test program.

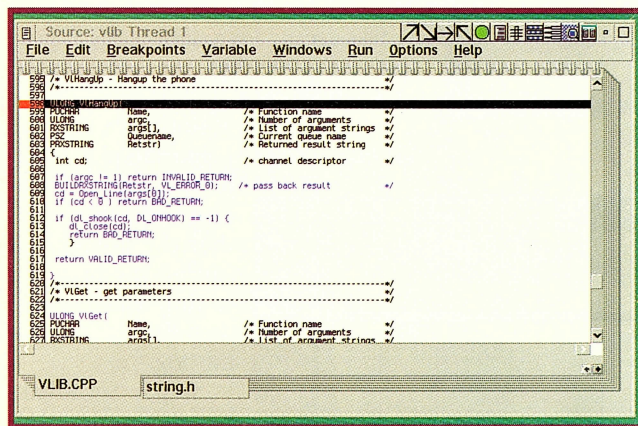


Figure 6: Setting breakpoints within DLL source code.

test script running under *cmd.exe*. Go to the session containing the test script and continue to single-step through the REXX script. On reaching the **VI-Hangup** instruction, IPMD detects a breakpoint and jumps to the source code panel (Figure 7).

Step 8: Step through the DLL source code. The current line displays in reverse video. At this point, we can start serious debugging by single-stepping through the C/C++ code, inspecting inputs and outputs as we go.

The full power of IPMD is now at our finger tips. To inspect a variable, just double-click on a variable name; to set additional breakpoints, double-click on a line number. Whatever you need to do, you can do it here!

As you're debugging, be sure to monitor the REXX window "debug Appl - CMD.EXE." If you have interactive trace set, then you must step forward within the REXX script to invoke (debug) other functions. Remember,

that in trace mode you can enter REXX commands at the keyboard, for example, to debug a function with different parameters.

Test concluded

With so many steps to it, the debugging process may appear complicated. It's not really: Because IPMD can save parameters, such as the name of the startup module and the DLLs that will cause a break when they are loaded, the process for subsequent sessions is simpler. Simplify the process further by creating a WorkFrame/2 project.

Think of the learning curve as a launching pad to new levels of productivity and personal fulfillment. **OS/2**

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Cowlshaw, M.F. *The REXX Language: A Practical Approach to Programming*, 2nd

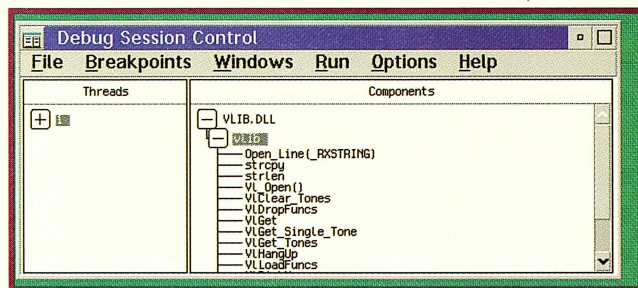


Figure 5: DLL components tree.

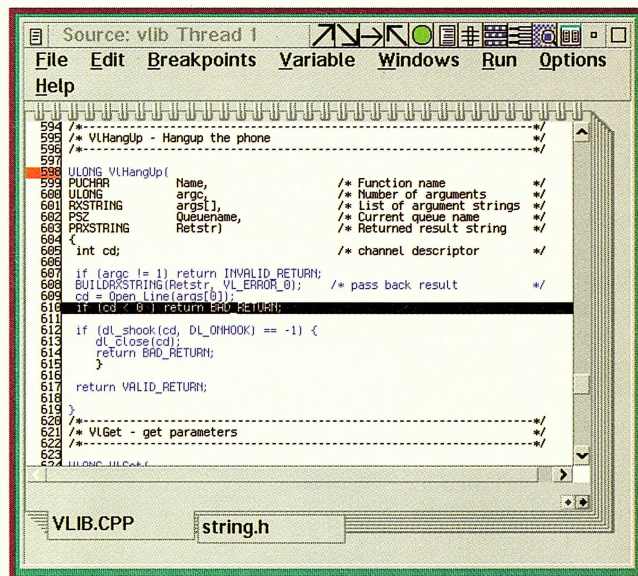


Figure 7: Single-stepping through DLL source code.

ed., Prentice Hall, Eaglewood Cliffs, NJ, 1990.

Gerstle, Patrick. "Getting the Bugs Out with IPMD," *Developer Connection News*, Volume 5, September 1994.

John Gillett worked in the research and development laboratories at IBM before starting Gillett-Sheen and Associates Ltd. GSA is based in Winchester, U.K. and specializes in telephony systems. John can be contacted at jgillett@cix.compulink.co.uk.

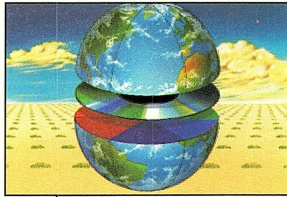
Norman Sheen was the product and market planner for IBM's CallPath/2 Interactive Voice Response products before starting GSA with John Gillett. Norman can be reached at nsheen@cix.compulink.co.uk.

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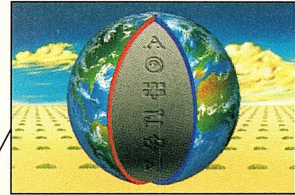
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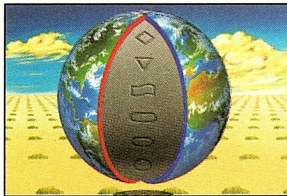
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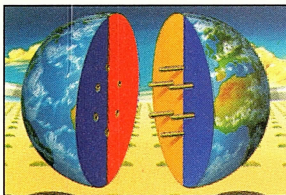
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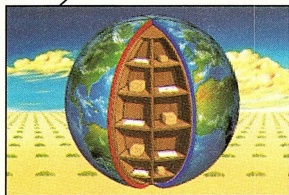
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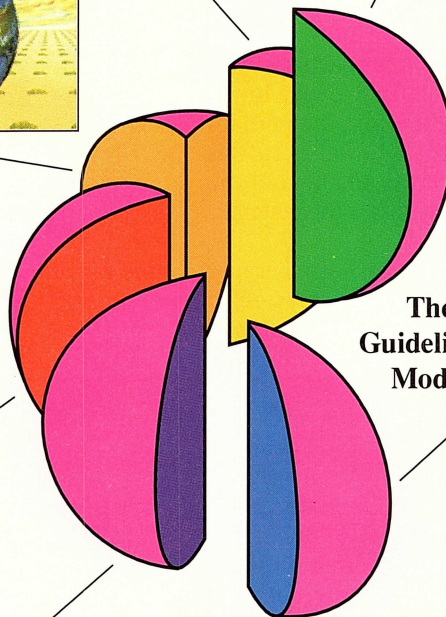
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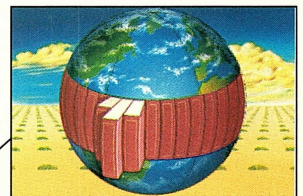
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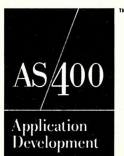
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A Programming Language

A specialized mathematical language meets OS/2. By Gregg Taylor.

In 1976, a few months after starting my first real job out of college, a salesman came to visit the actuarial department of the insurance company where I was employed. He asked the chief actuary to give him a problem our department was facing that he could perhaps solve for us. He was more than a salesman, however. He was an APL programmer, and within a few hours he had the problem solved and us convinced that APL was the language we needed.

I was impressed but really shouldn't have been, because APL is an easy sale to actuaries. Not just for actuaries, of course. I've found APL in all sorts of places, used for all sorts of things. Now, the frontiers of APL have been extended further, with the release of IBM's APL2 for OS/2.

APL, which stands for "A Programming Language," has never made it as a mainstream language. Designed back in 1962, APL is one of the original programming languages. It's only three years younger than COBOL but could never garner the popularity of languages like BASIC, COBOL, and FORTRAN, or even PL/1. Those in the APL community like to speculate about why things developed that way, but there was a basic design decision that tipped the scales against APL as a market leader. The decision was made very early to make APL a language that followed patterns of human thought, rather than the dictates of computer hardware design.

The implication of that decision is that people can easily use APL as a way to understand problems and resolve them, but computers have to work hard to translate that human notation into something they can work with. That is to say, the programs either ran slowly or used lots of computing resources. Speed has ever been the demi-god of the programming community, and APL has often been a sidelined observer in the race to be the fastest.

But APL has survived

As previously mentioned, APL (and now APL2 and a few other dialects of APL) found its way into many companies and institutions. This was because of that early design decision, but in these cases the decision makers have deemed the speed of development more important than the speed of execution. Actuarial departments, financial institutions (of the Wall Street variety), oil companies, airlines, and pharmaceutical companies head the list of users of APL. For them, APL offers the ability to quickly prototype, change

algorithms on-the-fly, play what-if games, and model complicated processes. For these companies, APL represents a short path to wiring the brains of their best people to the computer.

It isn't so much OS/2 as the new graphical user interface (GUI) that presents an interesting problem for APL2. (APL grew more sophisticated back in the early '80s and took on a new name, APL2, to reflect its matured status.) APL2 is mostly concerned with getting a job completed in a small amount of programmer's time. A program's human interface was an aspect of the program but hasn't, until recently, been viewed as central to the problem. With a GUI, the interface has now assumed center stage.

In this context, you might think of APL as similar to the spell-check button in a word processor. You can certainly get a lot of functionality without a complicated interface.

That doesn't mean that APL2 hasn't adjusted its ways to the GUI revolution. You can design very pretty dialog boxes, which respond to events, accept input, and perform sundry tasks. In fact, following APL2's general design philosophy, you can do this without learning the OS/2's Presentation Manager (PM) APIs. This is not to say that no learning curve exists; you still have to master the concepts of events, objects, and properties. It's just that the learning curve is less steep.

APL2 has always been something of an enigma. It has been scorned by large MIS departments but embraced by small groups of users within departments. It's been scoffed at by the professional programmer and used to tremendous benefit by the untrained. APL2 is a language purist's dream and an auditor's nightmare. However, it needs discipline to fall in with the mainstream. Otherwise, it ends up being a jumbled, creative, anarchic expression of human insight. While this anarchy has its place, there is a middle ground; it's just that it's not always easy to tame creativity or enforce standards in such an environment. APL2 has struggled with this image all its life and will continue to do so.

The language

APL started as an effort to clean up mathematical notation, in particular to make it more consistent. IBM first used APL as a notation to define the architecture of its 360 series of mainframes. It was first implemented as an interpreted language (written in FORTRAN) in 1963. Three of APL's most salient features find their roots in its origin: it has a mathe-

mathematical bent, its syntax is highly consistent, and it is implemented as an interpreter and not a compiler. Let's look at these aspects of the language first.

Character symbols. APL eschews the use of keywords in any particular written language, using instead single-character symbols. These include those that you might expect, such as + (plus), - (minus), × (times), ÷ (divide), = (equals), and ≥ (greater than or equal to); as well as a lot you may never have seen before, such as ⌊ (minimum), ⌈ (maximum), ← (assignment), ≡ (match), or ϕ (rotate).

The use of these characters has caused APL no end of grief—in the text-only early days of mainframe computing, APL programmers required special terminals equipped with this non-Latin character set. With the advent of PCs and GUIs, APL has found a more hospitable environment. Still, the human programmer has to learn most of these symbols in lieu of English language commands, and for some this is just too much to ask.

A consequence of using symbols instead of commands is that code tends to be more succinct. APLers like to point out that the history of man is one of the gradual, and painful, employment of symbolism. APL is just a step in that same, painful, mind-expanding direction. The human mind does grasp symbols (look at the inundation of icons in our GUIs), and, thankfully, APL's symbols tend to be somewhat graphically connected to their function. It's just a matter of getting used to them. In fact, several keyword systems have been implemented in various APLs over the decades, but none has been accepted as readily as the original symbols.

Syntax. Syntactically, APL is clean as a whistle, but unfortunately, different from the language on which most of us were weaned. Instead of having a hierarchy of function execution, where multiplication is performed before subtraction, for example, APL treats all functions the same and executes them from right to left.

The final thing that any single line of code does is assign data to a variable or prepare an argument for a function. In either case, this function or variable is at the left of the line, which ought to be where the execution ends (which it does). In APL2, you start at the right and end up at the left. In other languages, you start in the middle somewhere and evaluate according to arcane rules to end up at the left. It always strikes me as odd that fewer rules and more consistency could be harder to swallow than more complex schemes, but it seems to be so.

Some examples of APL code are shown in Figure 1, and a complete APL program is in Listing 1.

Interpreted. That fact that APL is an interpreted language is seen in Figure 1. When an action is typed in and <Enter> pressed, the expression is evaluated. If there is no variable used to capture the results, they are displayed on the screen. Answers are immediate. Experimenting is a natural. There is no wait time, no compile, just the response to the request. If the request wasn't exactly right, the programmer can simply adjust it until the desired results are achieved. This is what interpretive languages are all about.

Another aspect of APL2 that distinguishes it from other languages is that there are no type declarations. When a vari-

Figure 1: Some examples of APL code.

<code>A ← 1 5</code>	Index generator: first five integers
<code>A</code>	Show contents of variable 'A'
<code>1 2 3 4 5</code>	
<code>A ÷ .5</code>	Divide by a half
<code>2 4 6 8 10</code>	Division results appear
<code>B ← A ≥ 3</code>	Which items are greater than or equal to 3?
<code>B</code>	Show contents of variable 'B'
<code>0 0 1 1 1</code>	Ones indicate true condition, zeros indicate failed condition
<code>1 - B × A</code>	First multiply, then subtract
<code>1 1 -2 -3 -4</code>	Results show immediately. Note the high minus (-), which is different from the minus sign (-).

Listing 1: Sample APL program to print a calendar.

```

V Z←FDT;⌊10;A;B
[1] A 05/29/85
[2] A Use: Format Date and Time.
[3] A 'Z' is a 3-row matrix containing:
[4] A Row 1: Day of week (name)
[5] A Row 2: Month name, date, and year
[6] A Row 3: Time of day
[7] A Sample output would look like:
[8] A Thursday
[9] A November 23, 1995
[10] A 10:28 A.M.
[11] A
[12] A Set index origin to 0.
[13] ⌊10←0
[14] A Get current date and time from Time Stamp (yr mo da hr min).
[15] A←⌊TS[15]
[16] A First item is day of week.
[17] Z←'Monday' 'Tuesday' 'Wednesday' 'Thursday' 'Friday' 'Saturday' 'Sunday'
[18] A Sub-routine "DAY" returns index of day of week.
[19] Z←(DAY 3 A)÷Z
[20] A List of month names goes into 'B'.
[21] B←'January' 'February' 'March' 'April' 'May' 'June' 'July' 'August' 'September' 'October' 'November' 'December'
[22] B←B, 'September' 'October' 'November' 'December'
[23] A Build Month and date.
[24] B←((A[1]-1)÷B), ' ', ⌊A[2]
[25] A Add on year. Add to output vector.
[26] Z←Z(B, ' ', ⌊A[0])
[27] A Format the time item, including AM and PM.
[28] A←(⌊A[3]-12×B), ': ', (-2 '0', ⌊A[4]), '-5 'AP' [B←A[3]≥12], '.M.'
[29] A Add in time, make output into a matrix.
[30] Z←Z, A
V

```


Figure 2: Using language operators.

<code>A ← 9 ? 9</code>	Random number generator: give nine random numbers, without replacement in the range 1 to 9.
<code>A</code>	Show contents of variable 'A'
<code>2 8 6 7 3 5 9 4 1</code>	
<code>A ← 3 p A</code>	Re-shape list of numbers into a 3 by 3 matrix of numbers
<code>A</code>	Show contents of variable 'A'
<code>2 8 6</code>	
<code>7 3 5</code>	
<code>9 4 1</code>	
<code>+ / A</code>	Add rows of 'A'
<code>16 15 14</code>	
<code>x / A</code>	Multiply rows of 'A'
<code>96 105 36</code>	
<code>⌈ / A</code>	Find largest item in each row
<code>8 7 9</code>	

able is assigned, it may be boolean (truly a single bit), character, integer, floating point, or a mixture of any of these. The same variable may be re-assigned to be completely different—the interpreter takes care of everything. This language was made for humans, not computers; it figures out the type and frees the programmer from worrying about it. This makes the people who write coding standards

shudder, but it does speed up the development process.

Arrays and dimensionality. “Array-oriented” is the phrase used to describe APL2’s affinity for multidimensional data objects. A child of linear algebra, APL2 thrives on tables of names and numbers, tables of tables, and so on. While defining an array of 63 dimensions is totally unreasonable (but possible), some applications make

use of up to 11 dimensions. It’s also not unusual to use a 4- or 5-dimension array in common problems.

Dimensionality is a way to segment data that is closely analogous to real-world situations. Whether modeling a physical event in space/time (that is, four dimensions) or worrying about salesmen’s productivity by month, region, and product line (in four dimensions), keeping data items logically separate by using dimensionality is a wonderful tool.

Functions and operators. Of course, just storing the data in multiple dimensions isn’t enough to create a useful programming language. APL2 provides an extensible array of functions and operators that manipulate that data. One trick to using APL2 is to do as much as possible in a single operation. A lot of APL2’s overhead is expended figuring out those things that humans explicitly tell the computer in other languages. Once APL2 gets down to the business of performing the requested data manipulation, it fairly screams. Sure, APL2 can execute scalar (single item) operations, but it really shows its strength with manipulating large amounts of data.

APL2 is helped in this respect by the inclusion of “operators” in the language. Whereas functions like addition and multiplication work directly on data, operators work in conjunction with functions, like function modifiers, on data. The most often used of these operators is the reduction operator, designated by the slash (/). Figure 2 gives an idea about how it works.

The same operations may be performed along any axis, merely by specifying which one:

<code>+ / ⌈ 1 J A</code>	Add columns of 'A'
<code>8 15 12</code>	

The reduction operator has the effect of evaluating the array with the functional operand inserted between elements of the array. In the example that finds the largest number in each row, this would be the same as executing each of the following rows separately:

<code>2 ⌈ 8 ⌈ 6</code>
<code>7 ⌈ 3 ⌈ 5</code>
<code>9 ⌈ 4 ⌈ 1</code>

This reduction operation may be

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performed using any function that takes two arguments, including any written by a programmer. Several operators are native to APL2, and programmers may write their own. Along with APL being syntactically consistent, it's also not prejudiced against user-defined functions and operators. They enjoy the same status as native APL2 symbols.

Data manipulation

APL2 is a programming language, but you can use it interactively to manipulate data. This is great in an academic environment in which the concepts of massaging data arrays aren't lost in the unrelated business of programming. Nevertheless, most useful data manipulations are typically done more than once, so programs are written to store these manipulations in lieu of re-keying them every time.

Because APL2 requires none of the type declarations, links to external routines, or other "overhead," programming is not significantly different from the interactive experimentation needed to discover the data. In fact, it's easy to cut and paste code to and from an interactive session and a program edit window. Experimenting on-the-fly is easy, too. If something doesn't work quite right, it's easy to stop a program at any place, cut out a line of the function to the interactive session, try it, modify it, get it right, paste it back into the program, and continue on to the next line. Again, APL2 offers such flexible debug capabilities because it is an interpretive language. It is OS/2 and PM that allow the ease of cutting and pasting from multiple windows.

APL2 for OS/2

APL started in the 1960s as an IBM mainframe language. It quickly made inroads onto VAX, Borroughs, DEC, and other large systems. Then came the PC, where many flavors of APL2 exist today. IBM's APL2 is implemented on all of their mainframes, RS/6000, SPARC workstations, and on PCs under DOS and OS/2. These implementations are *almost* 100% compatible. The *almost* is in there because of the obvious concessions that have to be made for the operating systems each runs under, like file systems, screen I/O, and operating system interface. It's not hard at all to port applications among each of the platforms.

IBM has always had its eyes on the corporate market. While IBM focuses on this market, the APL2 group is trying to broaden their awareness by offering something for the home user, small business, or educational institution. Two versions of IBM's APL2 for OS/2 are available, one dubbed the *Entry Edition*, the other known as the *Advanced Edition*. The *Entry Edition* contains everything that the *Advanced Edition* has except for access to SQL-type databases and TCP/IP support.

APL2 has now met OS/2, and they seem to do well together. OS/2 probably won't make APL2 a mainstream language, but APL2 can still deliver on the raw processing power and quick development time that seems to slow down the PM development cycle. Perhaps the speed of machines these days is catching up with the demands of APL2, so APL2 may no longer be regarded as a laggard in execution speed. It is certainly the case that other applications are demanding more computing power while simplifying the human interaction with the computing machine. Maybe APL2 was just ahead of its time.

OS/2

References

Brown, James, Pakin, S., and Polivka, R. *APL2 at a Glance*, Englewood Cliffs, NJ: Prentiss-Hall, 1988, ISBN 0-13-038670-7.

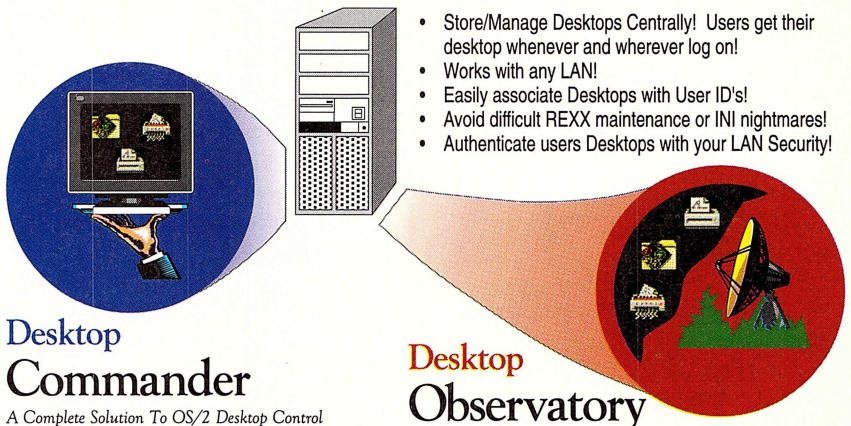
Gregg Taylor has been programming APL since 1976. He has worked in system design and optimization, written programmer utilities, devised programming standards, and managed development and maintenance programmers. Gregg is currently an independent contractor in the Dallas/Fort Worth area, working on both mainframe and PC platforms. He can be reached at 71033.372@CompuServe.com.

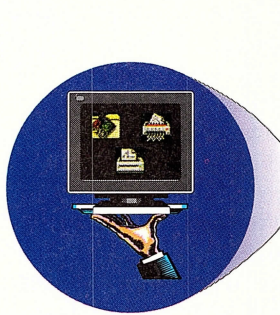
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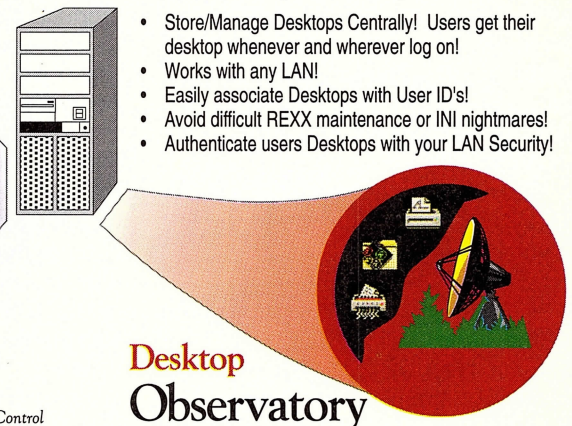
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Your Dog on Java. Any Questions?

BY ROGER SESSIONS

It's hard not to like dogs. You come home after a hard day. You turn on your computer. You type "dog". You always get the cutest little "woof woof".

The only problem I ever have with my dog is when I'm forced to use somebody else's computer. Then when I type "dog", instead of seeing my expected greeting I get:

SYS1041: The name specified is not recognized as an internal or external command, operable program or batch file.

I have thought of placing my *dog.exe* on my personal Web page. I would know then, that, wherever I am, on whatever computer I am using, and whenever I am feeling stressed out I can start up a Web server, download *dog.exe*, and get my reassuring little "woof woof".

This setup would work in those lucky situations that contain the following conditions:

- I am using an IBM compatible machine.
- I am using an OS/2 system instead of a you-know-what system.
- All of the DLLs my dog depends on have been installed.

Wouldn't it be nice if I could download my dog to *any* machine, while running *any* operating system, and know that I could count on my dog doing its little doggy thing?

For that matter, as a dog developer, who has invested thousands of person hours in developing my dog application, wouldn't it be nice to know I could sell it to dog lovers everywhere?

And that I wouldn't have to have one version for OS/2, another version for MVS, another version for Macintosh, and so on?

Smell the coffee

The ability to create a single executable and run it on any machine is the most important feature of a hot new programming language called Java. Like any self-respecting program developed in the last 10 years, Java is object-oriented, which makes it fair game for this column. Unlike other recently developed programming languages, Java has received unprecedented interest within the programming community, even before it was released as an official product. If you start getting interested in Java, there are a few web sites you might want to check out. These sites are described in Table 1.

Most of Java's publicity has focused on its ability to run programs within Internet Web browsers; it is within this context that most Java code is currently being written. However, over the long haul, it's the system independence of the program executable that may well prove its most historic feature.

On December 6th of last year, IBM announced that it had licensed Java, and that it "...intends to port Java technology to its OS/2 and AIX operating

systems, as well as Microsoft Windows 3.1, and it will make those ports available over the World Wide Web..."

IBM has already fulfilled at least part of this availability promise. At press time for this column, you can set your Web pointer to <http://ncc.hursley.ibm.com/javainfo/>, register as a Java developer, and download the entire beta Java system.

If you do, make sure you install Java in an HPFS partition. Java files use very long path names, and have no option for standard DOS-style 8.3 names.

Let's take a look at some actual Java code and get a feeling for the language.

We will start with an animal interface that defines the **eat** and **setFood** methods. From it, we derive a dog interface that adds on the bark method. The animal interface is defined in the file *animal.java*. The dog interface is defined in *dog.java* (Listing 1).

An interface describes what methods an object supports, but not how those behaviors are implemented. In Listing 1, the first line of both *animal.java* and *dog.java* uses the keyword **interface** to indicate that we are defining interfaces, not implementations. These interface files are used by clients to understand what behaviors are supported by their objects.

An interface can be derived from

Table 1. Java-related Web sites.

http://ncc.hursley.ibm.com/javainfo — The official IBM Java home page.
http://java.sun.com — The official Sun Java Home page.
http://sunsite.unc.edu/javafaq/javafaq.html — A great collection of Frequently Asked Questions about Java.
http://www.gamelan.com — Earthweb's extensive links to Java applets.

The World of Objects

Listing 1: Interface files.

animal.java:

```
interface animal {
    public void setfood(String myfood);
    public void eat();
}
```

dog.java:

```
interface dog
extends animal{
    public void bark();
}
```

another interface, as is our dog from our animal in Listing 1. This fact is indicated by use of the keyword `extends`. We say dog extends animal, meaning that dog will support all the animal behaviors in addition to its own.

In Java, a class is one of many possible implementations of an interface. Listing 2 gives the **animal_implementation** class, an implementation of the animal interface, and **dog_implementation**, **littleDog_implementation**, and **bigDog_implementation** classes—three implementations of the dog interface. We use the keyword `class` to indicate we are showing an implementation, not an interface.

Implementing an interface means to provide implementations of each of the methods defined in a particular interface. Our **dog_implementation** implements our dog interface, which, remember, includes the animal interface. We use the keyword, **implements**, to indicate that a particular class is implementing a particular interface.

Extending a class means deriving a new class from an existing class. The derived class can either add new methods or override existing ones. As shown in Listing 2, our **dog_implementation** extends the **animal_implementation** by adding a bark implementation to the `setFood` and `eat` implementations provided by **animal_implementation**. Our **littleDog_implementation** and **bigDog_implementation** extends the **dog_implementation** by overriding the bark method.

The use of interfaces is optional in Java. Most writers either don't describe it at all or describe it as a poor man's version of multiple inheritance. I think

this is unfortunate. The concept of interface descriptions, independent of implementation, is a useful concept. Describing all public classes with well-documented interfaces and distributing these as source files, while distributing implementations only as binary files, would be very natural.

Our client code is shown in Listing 3. In C++, client code is not typically a class.

In Java, everything is a class (except for interfaces, which aren't really things at all, but only definitions of things). You run a class.

As you can see in Listing 3, the class `test` defines one public static method

called `main`. It's defined as public so that it can be invoked publicly. It's defined as static, because it can be invoked without an actual object of the class being instantiated. The name of the method is `main`, which is the method that is run by default when running a class.

The method `test::main` declares four objects. Pooh is an animal, while Snoopy, Lassie, and Toto are all dogs. Keep in mind that animals are just interfaces. We won't discover what actual implementations will be used until object instantiation time.

The instantiations use the **new** directive, as shown in the client code. Through use of this directive, Pooh becomes an **animal_implementation**, a class which supports the animal interface. Snoopy, Lassie, and Toto become

Listing 2: Implementation program.

animal_implementation.java:

```
class animal_implementation
implements animal {
    String food;
    public void setfood(String myfood) {
        food = myfood;
    }
    public void eat() {
        System.out.println(food + " was very nice");
    }
}
```

dog_implementation.java:

```
class dog_implementation
extends animal_implementation
implements dog {
    public void bark() {
        System.out.println("Unknown dog noise");
    }
}
```

littleDog_implementation.java:

```
class littleDog_implementation extends dog_implementation {
    public void bark() {
        System.out.println("woof woof");
    }
}
```

bigDog_implementation.java:

```
class bigDog_implementation extends dog_implementation {
    public void bark() {
        System.out.println("Woof Woof");
        System.out.println("Woof Woof");
    }
}
```


`dog_implementation`, `big_Dog_implementation`, and `littleDog_implementation`s, respectively—all classes that support the dog interface.

Java has simplified the coding process with two decisions. The first is lack of support for pointers. The second is automatic memory management.

You can see the impact of both of these decisions in the implementation of the `setFood` method shown in Listing 2. This implementation requires only a single line of code:

```
food = myfood;
```

In C++, this code looks like:

```
if (!food) free(food);
food = (string)
    malloc(strlen
        (myfood)+1);
strcpy(food, myfood);
```

Two out of the three lines of the C++ version are dealing with memory management. Not only is most of the code doing memory management, but it's by far the most complicated code. The ability of Java to automatically manage memory is a considerable simplification.

Not only is the Java code simpler, it's less fragile. The Java version will work fine even if the food variable had never been initialized. The C++ code will fail on any system where food had not been initialized to NULL.

Java is heavily influenced by C++. The main syntax of declaring variables, using operations, and invoking methods is the same in both languages. The major differences, many of which we have already discussed, include the following:

- addition of the concept of interface
- addition of automatic memory management
- lack of support for pointers
- lack of support for multiple inheritance in class definitions, though it is supported in interface definitions
- lack of support for structures, which were considered redundant with classes.

Listing 3: Test program.

```
class test {
    public static void main (String args[]) {
        animal pooh;
        dog snoopy, toto, lassie;

        pooh = new animal_implementation();
        pooh.setfood("honey");
        pooh.eat();
        System.out.println(" ");

        snoopy = new dog_implementation();
        snoopy.setfood("dog food");
        snoopy.eat();
        snoopy.bark();
        System.out.println(" ");

        toto = new littleDog_implementation();
        toto.setfood("little dog food");
        toto.eat();
        toto.bark();
        System.out.println(" ");

        lassie = new bigDog_implementation();
        lassie.setfood("big dog food");
        lassie.eat();
        lassie.bark();
        System.out.println(" ");
    }
}
```

Program output:

```
honey was very nice

dog food was very nice
Unknown dog noise

little dog food was very nice
woof woof

big dog food was very nice
Woof Woof
Woof Woof
```

Similar to C++, Java has full support for polymorphism. (If you are unfamiliar with polymorphism, see "littleDogs, Polymorphism, and Frameworks," February 1996, p. 46.) You can see the polymorphic resolution of the bark method in the client code output shown in Listing 3, where the three different dogs bark differently based on their implementation of bark.

Java is heavily influenced by the Internet. The mindset of Java is to develop programs that, in their executable form, can be downloaded and run on any machine. In other words, Java seeks to create a universal executable.

Java accomplishes this universal executable by running all Java executables through an interpreter. The

executables are, in fact, compiled versions of the source code, but they are compiled for the interpreter.

This concept is different than our traditional notion of interpreters. Most interpreters run source code directly. This method achieves universality but at a considerable performance penalty. The Java interpreter runs binary code that has been heavily optimized by the Java compiler.

Unlike most binary code, the binary code produced by the Java compiler is universally standardized. It's exactly the same whether compiled on OS/2 or on Windows 95, because it's produced according to the standards set by the Java Interpreter, not the standards set by an operating system. It's the Java Interpreter that is responsible for getting the binary to run on a particular operating system.

Thus, we get both universality and performance. We get universality because the Java interpreter is responsible for running a program, and any machine with a Java interpreter can run any Java program. We get performance, because the interpreter is running pre-compiled code rather than source code.

We run the Java compiler by typing "javac" and the name of the source file, which

must include the extension `.java`. For example, to compile our test class, we type "javac test.java."

The compiler will automatically compile any other files on which this file is dependent. So for our test program, we will automatically compile `animal.java`, `dog.java`, `animal_implementation.java`, and so on.

The compiler generates files with the extension `.class`. In our case, the compile of `test.java` will result in `test.class`, `dog.class`, and so forth.

We can run any of these classes by invoking the Java interpreter and also the name of the class without any extensions. The only class that is meaningful to run is our test class, because it is the only class with a

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main. We run the test class by typing "java test."

Java is designed to be virus unfriendly. Java programs are intended to be downloaded over the Internet. We are all aware of the danger of downloading viruses. The Java developers wanted to make Java an unlikely carrier for viruses, so two mechanisms are used to protect Java programs.

The first protection mechanism is lack of support for pointers. We have already discussed this in the context of program simplification. Without pointers, writing a program that will wander outside of its address space, and, for example, starts usurping functions of the operating system is very difficult.

The second protection mechanism is through the Java interpreter. Because all Java programs run under control of the interpreter, Java has an opportunity to pre-screen programs before they are allowed to run. Considerable intelligence is being built into the interpreter to ensure that programs don't do things outside the bounds of stan-

dard operations, such as update system files.

In summary, let's recap the major Java features that make it attractive to online developers.

- Java is a full object-oriented programming language, supporting the three must-haves of any object-oriented language: encapsulation, inheritance, and polymorphism.
- Java supports separation of interface and implementation, allowing distribution of interface source without distribution of implementation source.
- Java is much easier to program than C++ due to its automatic memory management and lack of support for pointers.
- Java executables are machine-independent and virus-resistant, allowing them to be easily and safely distributed over networks.

So this is your dog on Java: simple, safe, and a dog that will follow you anywhere.

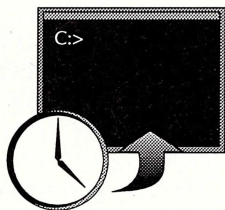
Acknowledgements

The sample code in this article is derived from some code I developed with Simon Nash at IBM. I appreciate his willingness to share his expertise and to let me use this code.

OS/2

Roger Sessions is president of ObjectWatch Inc., a company specializing in training and consulting in the use of CORBA technologies on IBM platforms. He has spoken at over 30 conferences and has written extensively. His books include Object Persistence: Beyond Object-Oriented Databases, Class Construction in C and C++; Object-Oriented Fundamentals, and Reusable Data Structures for C. Roger also publishes an Internet newsletter called ObjectWatch on SOM and can be contacted via e-mail at roger@fc.net.

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Reader Service No. 22



Everything's Under Controls

BY MARK BENGE AND MATT SMITH

Starting with this issue, we will explore and build custom controls that can make your applications easier to use and program and look great.

We are going to update some of the ideas we presented a couple of years ago in *OS/2 Developer*, by showing you how to use them within such design tools as the new IBM Universal Resource Editor. We will also build upon some of the things we have touched upon with bitmaps, to further illustrate the magic of bitmaps and raster operations (ROPs).

In the beginning...

As with all things, there is a beginning. We will begin with a foundation under which controls are built. Like an architect designing a house, we need to understand the structure before we attempt to create something substantial.

A control is just another window. By remembering this fact, you can create simple or very complex controls. If you have created a neat client window and want to reuse it in your other applications, you can easily convert it to a control by following some rules we will introduce shortly.

A control must be able to exist on its own. It should not be dependent on application data, and it should be able to handle multiple instances of itself within an application or between many applications. This definition implies that a control supports instance data.

Keep these two fundamentals in mind, as they will make it much easier to understand how controls work.

Control types

The three types of controls are static, interactive, and static/interactive. To give you an idea of what we mean, consider the standard controls within the OS/2 Program Manager (PM) in Table 1.

Static controls do just as the label implies—display static information. They do not allow any user input, either with the keyboard or the mouse. They are extremely useful for displaying information. This doesn't mean that they must be like the static displays we see in the art museum; they can be animated or moving.

Interactive controls, on the other hand, do allow input from the user through the keyboard or the mouse. They display information, and allow the user to enter new or alter existing information.

The last type of control, static/inter-

active, is sort of a hybrid. It allows the user to interact, but usually only to select things. Mostly, it does not allow the user to enter new or edit existing information.

The simplest type of control to create is the static control, the next hardest is the static/interactive, and the most difficult is the interactive.

Control architecture

As we mentioned earlier, a control is similar to a normal window; it reacts to exactly the same messages as your client window. What you do with these messages is what makes your control work.

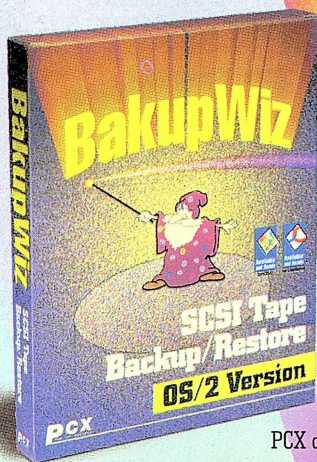
As with your standard window, the class of the control needs to be registered with the PM using **WinRegisterClass**. The only rule that you really need to follow is to reserve some extra window words. You should reserve at least eight bytes (two **ULONG** holders). The first **ULONG**, which corresponds to **QWL_USER** index of **WinSetWindowULong**, is used by the Universal Resource Editor and the user (usually when subclassing the control). This setup follows the design of standard PM controls that provide the holder.

The second **ULONG** (**QWL_USER + 4** bytes) is generally used for the control's instance data structure. This instance data structure is dynamically allocated when the control is created, and the pointer to the instance data is placed in this window word location.

Beyond the registration of the control class, the control window procedure needs to handle the creation of the control, the PM messages of interest, the event notifi-

Table 1: Control types.

Control	Static	Interactive	Static/Interactive
Buttons			•
Circular slider			•
Combo box			•
Container			•
Entry field		•	
Graphical button			•
Handwriting		•	
List box			•
MLE		•	
Notebook			•
Scroll bar			•
Sketch		•	
Slider			•
Spin button		•	
Text	•		
Value set			•



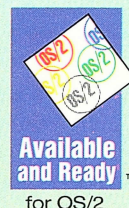
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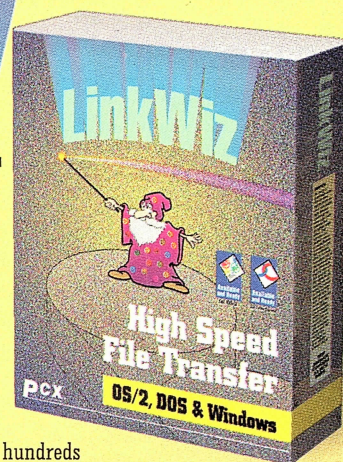
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cation to the control owner (usually as a result of the PM messages), the control messages that are specific to the control, and the destruction of the control.

A control can contain a simple design, which is essentially a single window (such as the button and static controls), or it can be what is known as a composite control. A composite control is made up of different windows (some of which can be controls in their own right). A good example is a list box that uses scroll bars. Another good example is the combo box, which uses entry fields and list boxes (Figure 1).

Entering hard-hat zone...

The manner in which a control is created is very similar to that of a standard window, but it generally doesn't have all the trimmings, such as a system menu, a title bar, the minimize or maximize buttons, the sizing borders, and so on.

Although we do create a standard window using **WinCreateStdWindow**, the trimmings are generally handled for you by the PM. You usually only worry about the client area of the window.

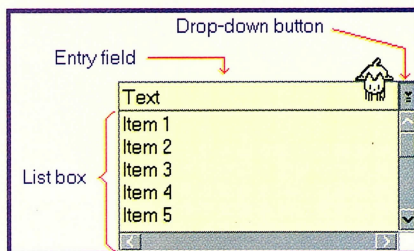


Figure 1: Composite control.

Whether the client area of a window is created through this function or a control, both receive a **WM_CREATE** message. It's through this message that you breathe life into your control.

Although you may be more familiar with the **WinCreateStdWindow** API, **WinCreateWindow** is the PM API that does the actual work of creating either your client window or your control window. The latter has a significant impact on many areas.

First, let's look at the API itself:

```
WinCreateWindow(HWND
    hwndParent, PSZ pszClass,
    PSZ pszName, ULONG flStyle,
```

```
LONG x, LONG y, LONG cx,
LONG cy, HWND hwndOwner,
HWND hwndInsertBehind,
ULONG id, PCTSTR pCtldata,
PVOID pPresParams);
```

WinCreateWindow contains many different parameters. Each parameter is very important to the creation of a window. Interestingly, each of the values contained in the API are passed to the **WM_CREATE** message through the **CREATESTRUCT** pointer in **mp2** of the message. The **pCtldata** is passed through the **mp1** of the message. The **CREATESTRUCT** is defined in Listing 2.

You'll notice that all of the parameters contained within **WinCreateWindow** are contained within the **CREATESTRUCT** structure. This information allows your control to understand immediately, during the creation process, what it should do to effectively set up shop.

Even though there are messages such as **WM_SIZE** and **WM_SETWINDOWPARAMS**, which you can use to handle the sizing and setting of text for the

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Listing 1: _Createstruct.

```
typedef struct _CREATESTRUCT { /* crst */
    PVOID pPresParams; /* Presentation Parameters Pointer */
    PVOID pCtlData; /* Control Data Pointer */
    ULONG id; /* ID Value */
    HWND hwndInsertBehind; /* Z-Order Placement */
    HWND hwndOwner; /* Owner Window Handle */
    LONG cy; /* Window Height */
    LONG cx; /* Window Width */
    LONG y; /* Window Vertical Placement */
    LONG x; /* Window Horizontal Placement */
    ULONG flStyle; /* Window Style */
    PSZ pszText; /* Window Text */
    PSZ pszClass; /* Class */
    HWND hwndParent; /* Parent Window Handle */
} CREATESTRUCT;
```

control, you won't receive these messages when the control is created.

That's because OS/2 PM, trying to be as efficient as possible, eliminates messages that are sent to do things that can be handled during WM_CREATE processing. Here you should use the x, y, cx

and cy fields of the structure to determine the initial size and position of the control. Likewise, if the control handles text, you should copy the text, which is pointed to in the pszText field, to an internal holder.

You should also record the owner of

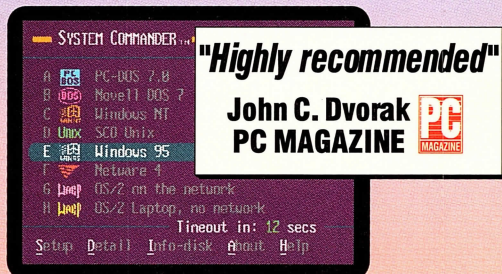
the control that is contained within the **hwndOwner** field so as to send notification messages back to the owner. The style of the control, which is contained within the **flStyle** field, should be saved to allow you to determine how to configure elements of the control and draw it.

The style field is of particular interest. The 32-bit **ULONG** is really divided into two parts. The upper half of the **ULONG** is used to record **WS_*** style flags like **WS_VISIBLE**, **WS_TABSTOP**, **WS_GROUP**, and **WS_DISABLED**. These styles are bit flag styles that use a single bit within the 32-bit **ULONG** to toggle a style on or off.

The lower half of the 32-bit **ULONG** is used to record your own style definitions for the control. The meaning of this area is up to you. Generally, it will either be bit oriented or sequence oriented. Examples of this are the button and entry-field controls of the OS/2 PM.

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The button control is sequence oriented, which means each numeric value has a different style. This setup, therefore, allows 65,535 different styles. The entry-field control is bit oriented, with each bit having a different style meaning. In this case, only 16 styles are possible.

The first type mentioned, sequence oriented, allows many more styles than does the bit-oriented type. However, the bit-oriented styles do allow combinations, whereas the sequence styles don't.

Even though bit-oriented styles only allow 16 possible styles, recording values within the CTLDATA of the control will get around this problem. We will talk about control data in our next column.

What happens next?

Having the information from the CREATESTRUCT, you can set up your control. One recommendation in designing your control is to try to cache information within the control's instance data. By this, we mean calculating drawing

positions only when changes to the control occur, not each time the control is drawn.

Using this approach, your control will be as responsive as possible to events that require its attention.

If you successfully set up the control, you return a 0 to indicate that the control was successfully created. The OS/2 PM will then send various messages to the control, such as WM_ERASEBACKGROUND and WM_PAINT, when appropriate. You would process the messages in which you are interested.

If you find that something is awry during the creation process, return a value of 1 to indicate that the control was not successfully created. The OS/2 PM will then return a NULL from the WinCreateWindow. Depending on where the WinCreateWindow was being used, other controls may or may not be created. In the case of when a dialogue is being created, the process will be stopped. If this mishap has happened to you, and you were wondering what was wrong, this is most often the reason.

The simple example

Our sample code this month shows the processing of the WM_CREATE message. The control is a simple static control. It shows how to set up the instance data and cache the necessary information within it for later use. We will flesh this out in the next couple of issues.

Stay tuned, don't change that channel

Next issue we will explain the concept and usage of CTLDATA. You can be very creative in this area, which allows your control to be extremely powerful. It can also make your usage of the control much easier. **OS/2**

Mark Bengel, IBM Software Solutions, RTP, N.C., is a staff programmer who joined IBM in 1989 and has worked on various CUA '91 controls for OS/2 2.x. He works in IBM open class library development, where he develops class library code for OS/2 and Windows. Mark has a B.S. in computer science from Western Carolina University. He can be reached on CompuServe at 73532,2063 or at Internet at banzai@raleigh.ibm.com.

Matt Smith, Prominare Inc., Toronto, Ont., is lead architect for Prominare Designer and Prominare Validator as well as the new IBM Universal Resource Editor. He has been involved with OS/2 since 1988. He has a degree in architecture from the University of Waterloo and can be reached on CompuServe at 70363,1175 or at Internet at msmith@prominare.com.

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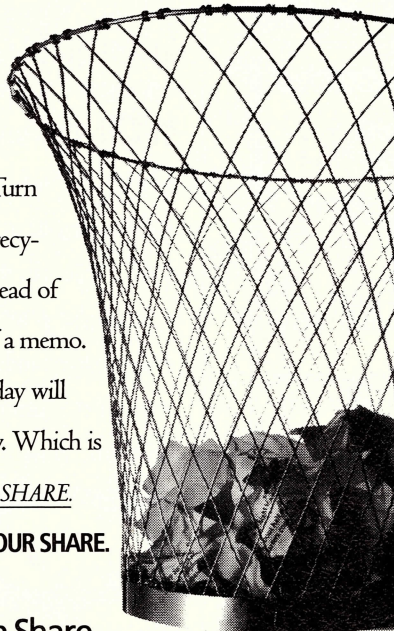
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Guidelines for Programming

BY GUY SCHARF

This month, we'll look at Guidelines 3.3 from JBA International and at programmer utilities for comparing and merging source files.

JBA has released version 3.3 of its Guidelines client/server GUI development environment. Applications written in Guidelines can be compiled for OS/2 or for Windows 3.1 with the click of a button. Programming is made easier with a high-level JOT language that can be supplemented with C or C++ if desired. Version 3.3 supports VisualAge C++, Borland C++ 2.0 for OS/2, and Watcom 10.5, as well as Borland C++ 4.0 and 4.5 for Windows.

Guidelines is available in several different configurations. The Guidelines Basepack supports the controls that were standard with OS/2 1.3. This version is intended as an evaluation version and is available for free. The Professional Developers Toolkit (PDK) adds the CUA '91 controls, such as the container and spin button, and Guidelines' own enhanced controls: graph, button bar, toolbar, status bar, grid, enhanced text, and picture controls. The PDK also adds support for timers, SOM, DDE, file system manipulation, profiles, and access to system information, as well as additional utility programs. Significant additional power is available in Extension Packs for database connectivity, messages, Lotus Notes access, image control, Windows support, and more. Client/Server access is provided to DB2/2, DB2/400, DB2/6000, Oracle 7.0, and to databases supporting ODBC. Finally, a corporate development edition

generates code for Unix and AS/400 servers. The list of available features is extensive and allows Guidelines to address a wide range of problem areas.

To deliver on the cross-platform promise, Guidelines must support containers and other OS/2 2.x controls on Windows. It does this by including DLLs to implement these OS/2 controls in Windows 3.1. Guidelines also supports threading and presentation parameters on Windows 3.1.

Installation is straightforward. With only the IBM VisualAge C++ compiler defined and no sample code, the base pack required 7MB. The PDK, with all extensions, documentation, and samples installed, but still only one compiler, required 45MB. Guidelines documentation states that 16MB of memory, 30MB of swap space, and a display resolution of 1024x768 are required to run Guidelines. While Guidelines will run on OS/2 2.1, JBA promises defect support only for problems reproduced on OS/2 Warp.

I examined the PDK and looked briefly at other extension packs. I tested Guidelines with the IBM VisualAge C++ compiler running on OS/2 Warp Connect.

Ease of use

To create an application in Guidelines, select File/New GUI and then create a Frame or Dialog window. You place controls on your dialog the way you would with the OS/2 dialog editor—select from the Create Menu or use the toolbar. You control the placement of controls with alignment tools by dragging, or by editing, the coordinates directly. A snap-to grid is available. You can change the control's name and text using entry fields at the top of the screen or by double-clicking on the control to bring up the dialog for the control.

Besides allowing you to set the style flags for the control, this dialog gives you complete access to the presentation parameters. You can set fonts and colors easily, and any changes you make from the system defaults are clearly indicated.

Like other GUI application development tools, application behavior is defined by program code associated with events—called actions in Guidelines. You open the action editor by right-clicking on a control or window. A default action is opened; a pull-down listbox allows you to select any event for that control. Other listboxes select the parent and child window. You can edit any action for any control once you have

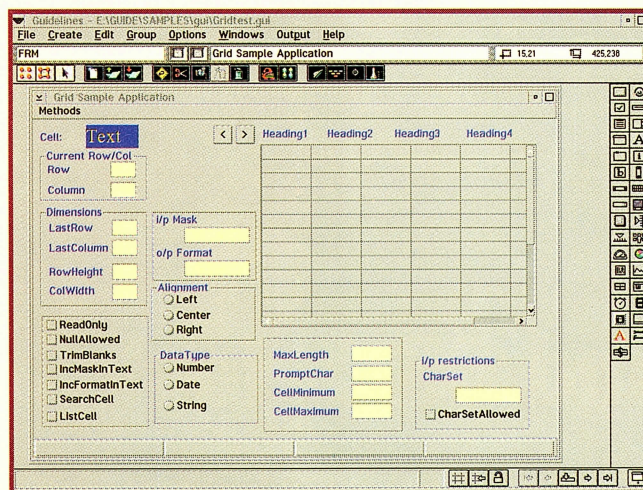


Figure 1: Guidelines design window.

opened the action editor, without returning to the design window.

You program the behavior using Guidelines' JOT language. This is a higher-level language, less cryptic than C or C++, and is intended to be easier to learn. It requires that each statement be on a separate line, thus avoiding punctuation required in C. JOT provides verbs for common actions. Using these JOT verbs is required for Guidelines to generate code for either OS/2 or Windows. You can easily embed C or C++ code, including preprocessor directives, in an action by prefixing the statement with C:. Alternatively, you can call external functions written in C or C++.

An interactive prompter will generate skeleton code for some statements. The prompter only places the skeleton in the file; it doesn't prompt you for the values to be substituted in the statement. I found the prompter only moderately useful. The help system was more useful. Guidelines does not support drag-and-drop programming, so you must write all of the statements yourself, supplying the necessary window and control names (although the prompter will help you find them). You may define your own structures, global variables, and external structures and functions within the action editor.

After writing any action code, you can check the syntax of the current action window by pressing <F2>. You can optionally ask Guidelines to check the syntax of any action window whenever it is closed. This feature considerably improves productivity because syntax checking is done during editing instead of later by a compiler.

A test mode allows you to view the dialogs but does not simulate the

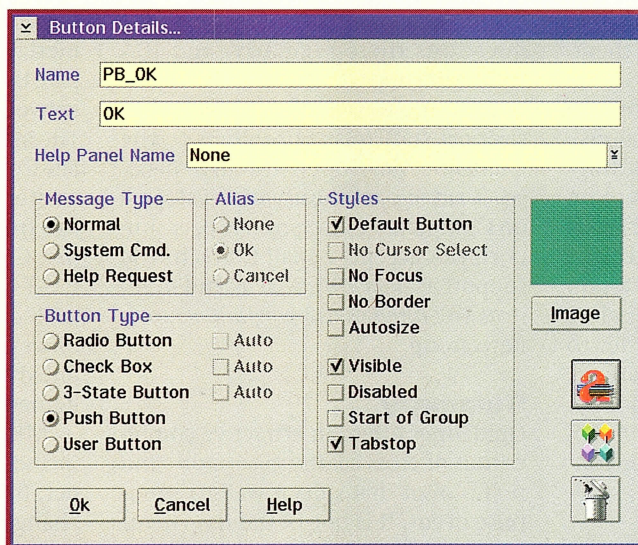


Figure 2: Dialog box for a pushbutton control.

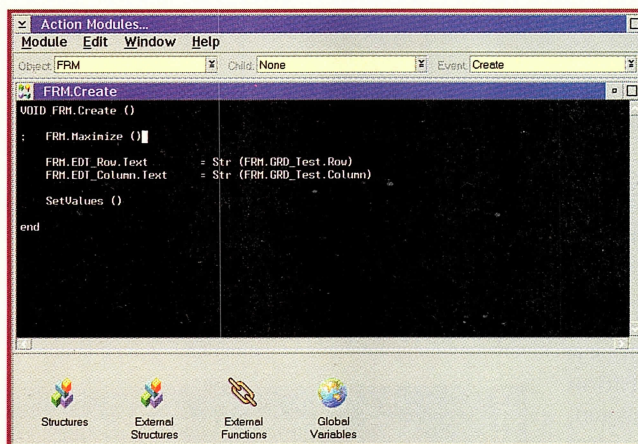


Figure 3: Action editor.

action code. For that, you must compile and run the application. Select **Output/Generate**, and Guidelines converts the JOT code to C++, compiles and links, and runs the application. Dialogs exist to tailor the compilation environment by setting paths, environment variables, and compiler command lines. Two environments are supplied for each supported compiler—a production and a debug environment. You can easily modify these or add others.

You can build a Guidelines application relying on Guidelines DLLs, or you can link without requiring those DLLs. A simple "Hello, World" window resulted in a 7K executable file

when using the DLLs, and a 104K executable file was produced when linking without the DLLs. Guidelines has no built-in debugging facilities. You must use the debugging tools of your compiler. However, Guidelines does make it easy to select the debugging switches for compilation and linking.

The PDK provides additional controls needed to develop a complete application. The Grid control acts as a spreadsheet or table. Both alphabetic and numeric input and output are supported. A formatted entry field improves the editing of input data and allows you to show separator characters. The Graph control supports line, point, and combo charts, as well as pie and bar charts. Charts may be displayed in two or three dimensions. Toolbar and button bar controls make it easy to add buttons and other controls that enhance usability. A status bar control is supported and may itself contain other controls. For displaying digits and uppercase letters, a LED control provides an alternative to the standard OS/2 fonts and static text fields.

Warts and blemishes

Installing the PDK requires installing the base pack, followed by a PDK extension. I found minor differences between the tutorial documentation and the actual screens, but these discrepancies did not detract from the usefulness of the tutorial.

Guidelines has an option to display a VGA screen outline, which helps in designing dialogs when using high-resolution screens. However, it does not identify clipping that may be caused by differences in fonts at different resolutions. If your application is going to run on a system with a lower resolution screen than the design system's, you will need to test for inadvertent clipping.

If you want a naming convention for windows and controls, you must do that yourself. Guidelines doesn't automate any useful naming convention. The Action Editor does not show which events have actions defined for them. The separate JOT Code Browser shows all defined actions, but the browser does not allow you to edit the actions.

Guidelines doesn't support drag-and-drop programming, a prompting tool for writing JOT statements, or context menus. These features would make Guidelines more approachable. I found the user interface quite usable, but JOT language would have been easier to learn with a more modern interface. The right mouse button is used for fly-over help or to invoke the Action Editor or language help and not for context menus.

Limits of applicability

Guidelines offers cross-platform support for OS/2 and Windows 3.1, allowing the developer to write code only once. Support for Windows 95 and Windows NT have been announced for the third quarter of 1996 and first quarter of 1997.

The high-level JOT language may be more comfortable to programmers familiar with older 3GL languages. C programmers may find it verbose. With the higher-level language, multi-platform support, and enterprise-oriented extension packs, Guidelines is well-suited for corporate application development. Because Guidelines generates C++ code, it is also a platform that may interest independent software vendors.

Guidelines is designed for building client/server applications. Although you can develop applications using SOM, this is not a tool for developing Workplace Shell applications.

Documentation and support

Four manuals are included with the PDK: *Guidelines Installation*, *Getting Started with Guidelines*, *Using Guidelines*, and *The JOT Language*. The manuals total about 400 pages, half of which are devoted to the JOT language. The *Getting Started* manual includes a useful tutorial that walks you through creating a small application. *README* files describe the enhancements in version 3.3 (the

printed manuals are apparently still at the version 3.2 level).

JBA supports Guidelines in its section on CompuServe's OS2AVEN forum (*GO GUIDELINES*). Users post questions there regularly, and JBA technical support staff usually answer within one to two days. A technical support staff relays problems to the Guidelines development staff as needed. A small community of developers on CompuServe also provide peer support. JBA accepts e-mail for technical support at support@jba.co.uk and monitors the comp.os.os2.programmer.tools newsgroup.

Summary

Guidelines offers an attractive combination of cross-platform support and rich toolset that suits it well to enterprise needs. It is one of the few client/server products that can write code for both the server and the client. The higher-level language is likely to be especially appealing to the corporate and downsizing markets.

Comparing Source Modules

I recently needed to compare different versions of source files and port changes from one version to another. So I went looking for an editor that would show differences visually and allow me to edit a file at the same

time. While I could not find that exact combination of features, I did find some interesting products.

Utilities that create text files showing differences between files are common. Visual comparison utilities compare two files and highlight differences between them using color or shading. The most accessible utility is Graphical File Compare (GFC). As IBM employee-written software, GFC is available for free from various ftp sites on the Internet, CompuServe, or the IBM DevCon CD-ROM. It can show you each file with changes needed to produce the other marked. It can also display a combined listing with the differences highlighted with color.

MKS' Source Integrity product includes a useful visual difference product. It displays one or both files with changes marked or a combined file. A useful merge feature, shown in Figure 4, lets you compare two files and select which changes you want from each file. Unfortunately, you can't include changes from both files.

I also examined differencing tools in several PM editors. MicroEdge's Visual SlickEdit does have a file comparison tool, but differences are not visually highlighted. A command moves the cursor in both files to the next point in which the files match. Of course, Visual SlickEdit will let you actually edit the file. I ended up using

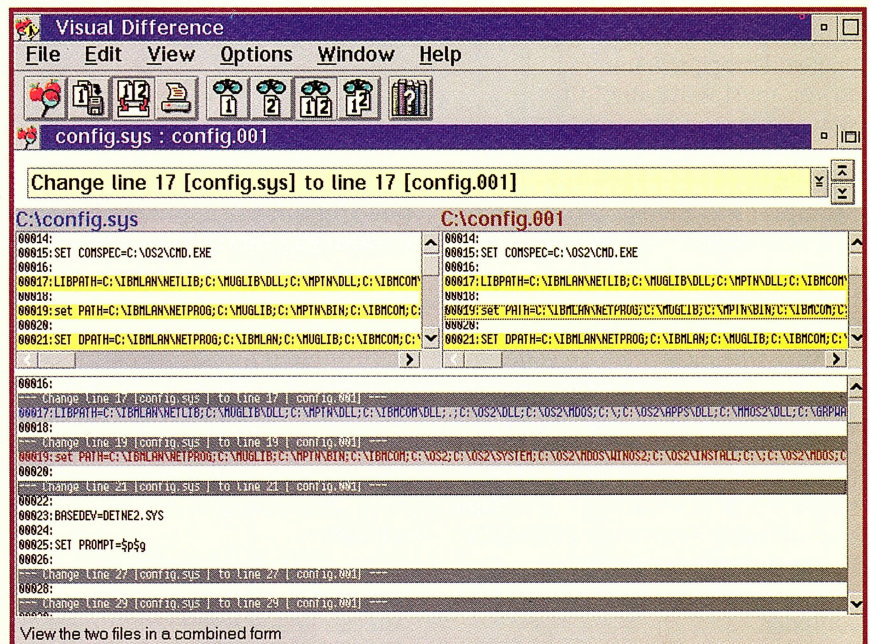


Figure 4: MKS Source Integrity's Visual Difference utility.

GFC to compare files while having the same files open in an editor to resolve the differences.

A common problem in software development is reconciling two sets of changes to the same source module. Three-way merge utilities read two source files and their common base to produce a combined source file. These utilities are often included with version control systems. I examined VMRG from Intersolv's PVCs Version Manager and MERGE from MKS' Source Integrity products. If an area of code is changed in only one derivative module, both programs include the change in the combined file. If the same area of code is changed in both derivative modules, the programs include code from both with markers so that you can edit the combined file. If all is well and only one change is to prevail, it's usually easy to delete the unwanted code and markers.

I merged 40 source modules with diverging changes using both utilities. Both programs merged individual changes easily and marked where

changes were made in both files. On small changes, MERGE sometimes marked a change as a discrepancy between the two files, while VMRG considered it a nonconflicting change. In larger, more complex areas, both utilities placed markers in the code, but the ones placed by MERGE sometimes identified the conflicting changes better than the ones placed by VMRG.

No automated merge of source code changes should be accepted without examination. There are too many ways that changes can conflict without the conflict being obvious to a utility program. Nevertheless, a merge program can be useful as part of an integration strategy. Besides, sometimes you are stuck and really need a utility like this!

OS/2

Guy Scharf is president of Software Architects Inc., a software development firm specializing in developing OS/2 Presentation Manager applications for vendors and business. He can be reached by e-mail at guy@swarc.com.

Resources:

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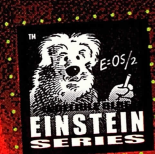
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Concise File Exit

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File Manager/2 2.40a

As good as OS/2's Workplace Shell is, much can be done to make it even better. Winner of a 1995 *OS/2 Magazine* Editor's Choice Award, File Manager/2 (FM/2) has been updated to make management of your files even smoother.

The documentation says, "FM/2's main purpose is to show you what's on your file system and let you sling what's there around." I couldn't have said it better. FM/2 accomplishes this via an extensive collection of utilities that help you maintain control over your system. These utilities appear separately in FM/2's folder, but they can all be accessed from within the FM/2 shell as well (Figure 1).

Complete guide to file systems

We don't have enough space here to go into great detail on each of the included utilities, but let's at least summarize them.

ArchiveManagement: FM/2 can act as a shell for managing archives using

ARC, ARJ, LHarc, ZIP, and Zoo formats. The actual archive programs aren't included, but FM/2 knows the command line formats for each and can automatically call the desired archive program against selected files. FM/2 can also peer into archives and list the files stored there. The files can be browsed through FM/2's Internal Viewer (or another browser of your choice), without being extracted from the archive. They can also be executed, printed, removed from the archive, or even scanned for viruses (using a separate virus-scanning package such as IBM AntiVirus/2 or Dr. Solomon's AntiVirus Toolkit), without extraction. Files can be extracted into a specified directory or the original directories from which they were archived (if the directory information was saved).

Collector: This Workplace Shell container acts like a temporary storage place for objects. If you wanted to perform some function on files from several different locations, drop those files onto the collector (this is similar to a

shadow operation, so disk space isn't taken up with physical copies). You could then perform operations on all files in the collector, just as if they were in the same subdirectory. The results of *Seek and Scan Files* operations are placed in the collector for manipulation.

Databar: The databar is a small, optional window at the bottom of your screen, containing helpful information on the amount of storage used and available on your disk partitions, your swap file, and your memory (Figure 2).

Extended Attribute Viewer: This utility allows you to browse the extended attributes associated with files (but not subdirectories).

Global File Viewer: This utility displays all files (including hidden and system files) on a partition in a single window, without divisions by subdirectory. From this list, you can perform all the standard file manipulation functions, such as renaming and copying, as well as all the FM/2 functions, including archiving and viewing extended attributes.

INI Viewer: This program allows you to browse, edit, and backup your initialization (.ini) files.

Online Help Viewers: FM/2 includes a graphical front end to both online books (.inf files) and online help (.hlp files). These programs scan the subdirectories in the SET HELP and SET BOOKSHELF entries in your *config.sys* file and display a list of the online help information found in those subdirectories. You can then select the information you want and load it into OS/2's native online documentation readers.

Process Killer: This utility displays all processes running in your system and allows you to kill processes that refuse to shut down normally. Unfor-

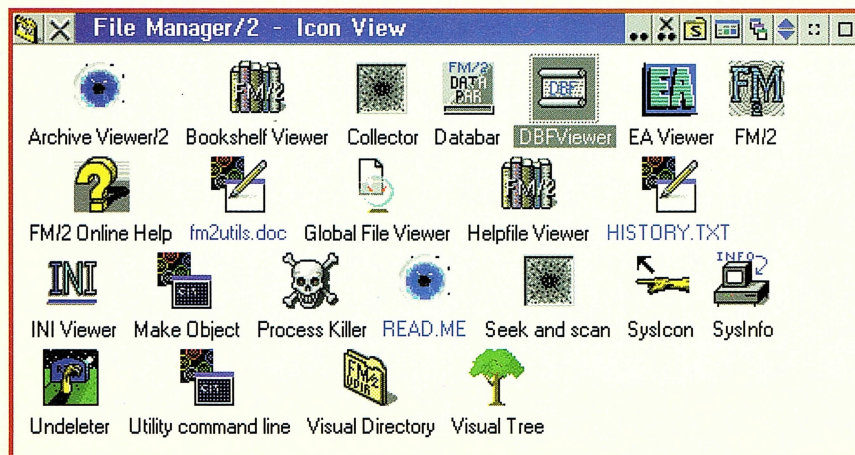


Figure 1: FM/2 is a collection of file management utilities.



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Test Drives



Figure 2: The Databar displays storage usage information

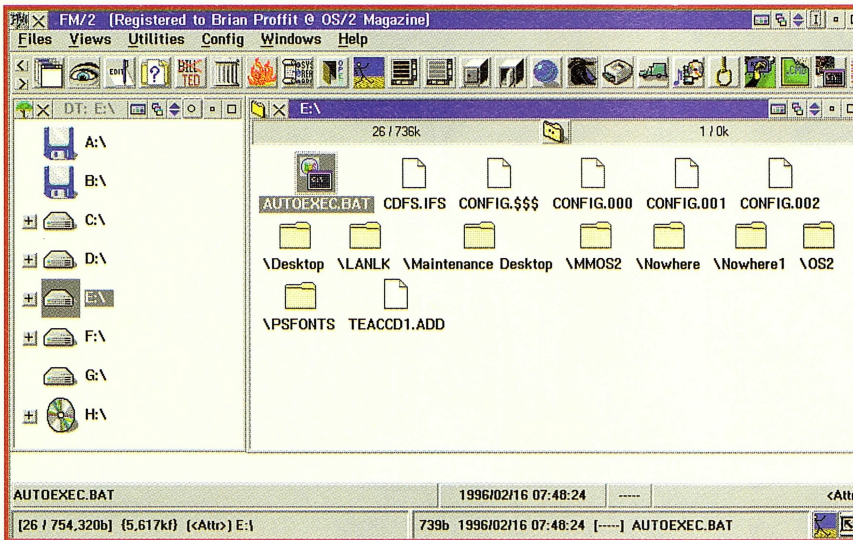


Figure 3: The Visual Tree and Directory views.

tunately, OS/2 doesn't provide FM/2 with enough information, and all Win-OS/2 sessions show up merely as [kernel]. (It takes a lot of courage to terminate a process that appears to be part of the kernel!)

Seek and Scan Files: More functional than the program included in OS/2's System/Productivity folder, this utility can also search for text in extended attributes. It allows multiple filters on the search, including filters based on file size and date. The results of the search are placed in the collector.

SysIcon: This program allows you to replace the default OS/2 system pointers with any icon of your choice. The boring clock, when the system is telling you to wait, is one that definitely needs replacing!

SysInfo: This utility give you more system information than you ever wanted about how OS/2 is configured. Details include the delay time, in milliseconds, on menu rolldowns.

Undelete: This is a nice front-end utility to OS/2's UNDELETE program. Note that it's not a file recovery program. If you aren't using OS/2's DELDIR function, this won't find your files.

Visual Directory/Visual Tree: This utility gives you views of your disk contents similar to the Workplace Shell

Drives object, but enhanced graphically and linked to all of the FM/2 functions I have listed and more (Figure 3). One disappointment here is that FM/2 doesn't respect the associations you have defined for the Workplace Shell. You have to redefine your associations here to use them from within these views.

Glee or flee

So much is jammed into this package that it's impossible to do it justice in any one article. Barebones Software makes the point in its documentation that casual users shouldn't be scared off

by the fact that they don't understand all of FM/2. They're right. Understanding or using all of FM/2 is unnecessary to derive value from it. People are paying nearly the same amount just for archive managers—a small part of FM/2's functions.

Many command line junkies haven't moved to full GUI operation yet because of the difficulty of performing some operations with the Workplace Shell. If you're one of those, I suggest you take a look at FM/2. It's shareware, so you have the freedom to try it before making a decision. As always, though, I must stress the importance of registering FM/2 if you decide to keep it.

Concise Columbia Electronic Encyclopedia

Naysayers frequently point to the void of entries in product categories, such as reference works, as an indicator of problems in OS/2 Land. I suppose that depends on what you think OS/2's target audience is... but that's a topic for an editorial. Dux Software is trying to fill that void by offering first, the American Heritage Dictionary (see October 1995, p. 50), and now the Concise Columbia Electronic Encyclopedia.

A user interface a mainframe would love

The first thing you notice is that the interface is, well, bland. But then I guess you only need a lot of icons and buttons in your window if you have a lot of functions from which to choose

Test Drives, *cont'd* on p. 68

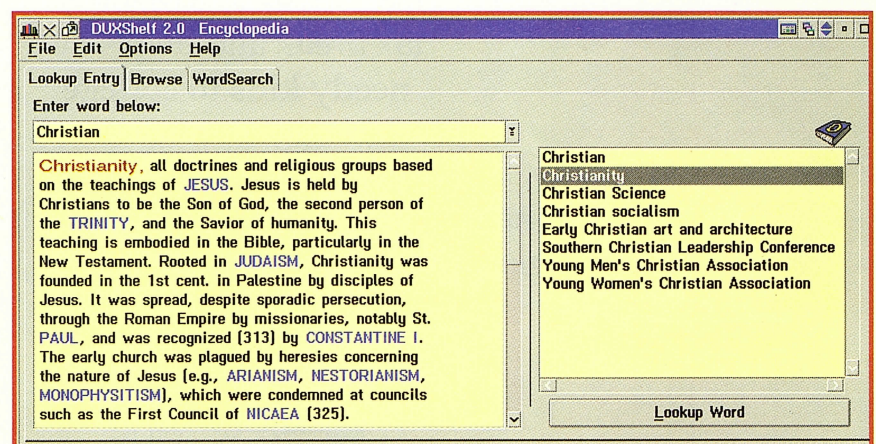


Figure 4: The Encyclopedia uses hypertext but no graphics.

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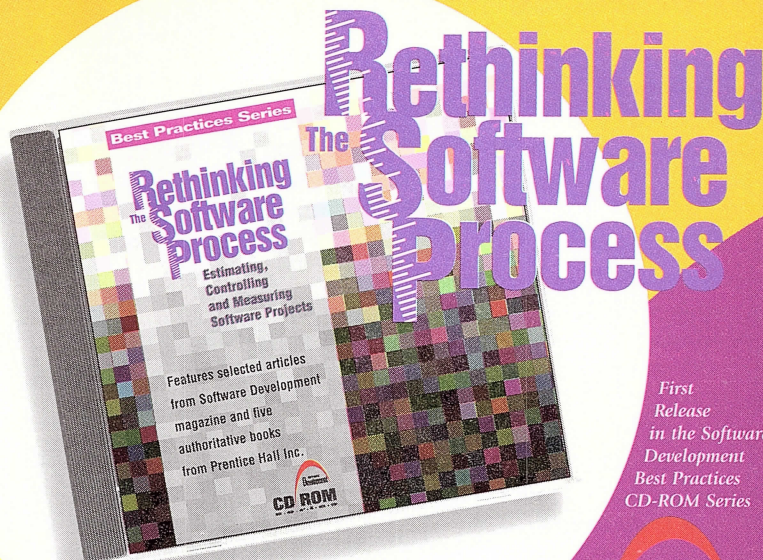
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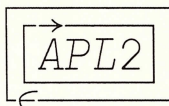
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Reader Service No. 31

Test Drives, *cont'd from p. 62*

among. Rather than a product designed for the computer, this one is largely a book placed on CD-ROM. Actually, it's also available on disks, which gives you a clue as to how much actual information is on it. The encyclopedic data fits in less than five megabytes. Pay close attention to the first word in the product's name; this is a *concise*, not detailed, encyclopedia. Of course text doesn't really take all that much space, so five megabytes isn't a terribly tiny amount.

A bigger problem comes from Dux's decision on how to fill the rest of the 650 megabytes on the CD-ROM. It didn't. All the multimedia effects that you expect from computer-based encyclopedias are absent. No pictures of famous figures and events, no sound clips of great speeches, and no video clips of rockets launching are present. Admittedly, printed encyclopedias have done without sound and video for years, but imagining one without pictures is difficult.

Out of curiosity, I decided to look up *stamen* and see if I could determine what and where one was without a diagram. Nope. All I could gather is that it lives somewhere between petals and pistils. A picture really can be worth a thousand words—and if you are only going to provide a hundred words, you'd better augment them any way you can. No research aids exist, such as topical subindexes that help you narrow in on a topic when you're not sure where to begin. You can't even change the font of the text. So if you're accustomed to using larger type for better readability, you're out of luck.

However, this encyclopedia has a keyword browse facility, which can generate some interesting connections. For example, as soon as you type *d* in the browse entry field, the topic list scrolls to World War II. Apparently the first indexed word starting with that letter is D-Day. On the other hand, I really appreciate its allowance of wildcard characters in browse and search words. If you're uncertain of spelling, the ability to use *** and *?* is quite handy. You can use *AND*, *OR*, and *NOT* to more narrowly define your search. If you enter a search word that isn't found, the program suggests possible alternative spellings. They also included hyperlinks, which make it easy to

jump from topic to topic. You can back-up through the chain by clicking the right mouse button.

Once you've found that special bit of information, perhaps you would like to make sure you remember it. Sorry, there's no way to print. Nor is there a way to mark specific text that you would like to copy to the clipboard. You can either copy the entire entry to the clipboard or nothing at all.

Glee or flee

If OS/2 was unable to run Windows applications, I would probably be grateful that an OS/2 encyclopedia was finally available. That's not the way it works. I'm happily running Grolier's and Compton's Multimedia Encyclopedias in Win-OS/2 sessions. I'm accustomed to having pictures, graphs, and sound and video clips to bring the stories to life. I'm accustomed to a much richer user interface. On the positive side, Dux is now bundling the American Heritage Dictionary (with the same user interface) with the encyclopedia and throws in SimCity Classic as the Dux Bookshelf.

I'm delighted that Dux is trying to fill openings in the OS/2 product line. However, it needs to realize that its competition isn't limited to OS/2 products. Before I can recommend this product, Dux must be able to compete with Windows products as well.

I must also mention a concern about support for this product. I went to Dux's World Wide Web home page,

and the Columbia Encyclopedia wasn't listed as one of its products. When I called the 800 number (during business hours), I got no answer and was sent to voice mail. The call was never returned.

Xit 2.1

"Just a click away." How many times have you seen or heard software marketing that makes this promise? One of the supposed beauties of OS/2's Workplace Shell is this possibility of great simplicity in our computing. And yet most of the time, it seems that things are actually a double-click away, or a click-to-bring-up-a-menu-then-click-on-something-in-that-menu away (which presupposes that you know which menu has the thing you want to do).

Thankfully, IBM built great flexibility into the Workplace Shell, giving programmers the ability to change many of its components. Xit (they wisely prefer the pronunciation *ex-it* to *zit*) exploits that ability to make many more functions truly just a click away.

Filling the title bar

Xit works its magic by modifying the title bar of your OS/2 and DOS windows. (Unfortunately, Xit can't make the same changes for Win-OS/2 windows, because Microsoft didn't base Windows on the OS/2 System Object Model.) As you can see in Figure 5, Xit adds several new buttons to the title bars. The buttons found will differ based on the window type. For exam-

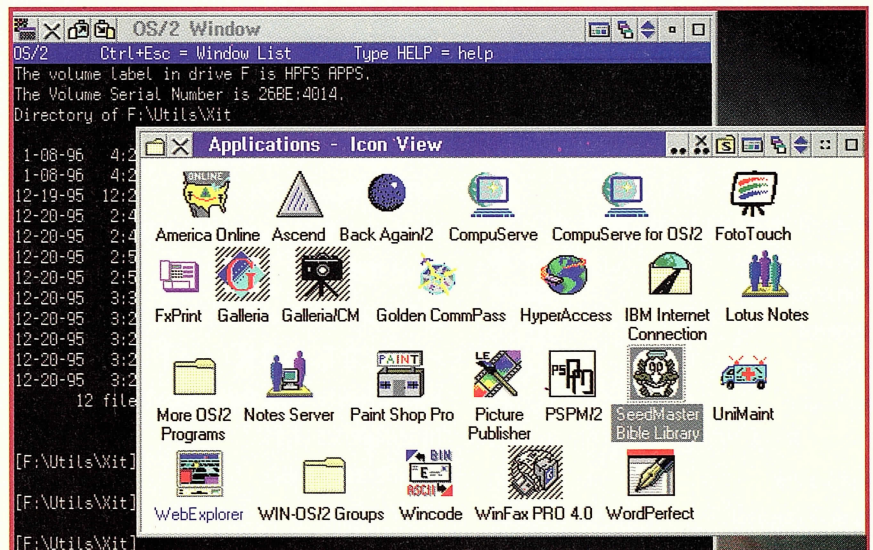
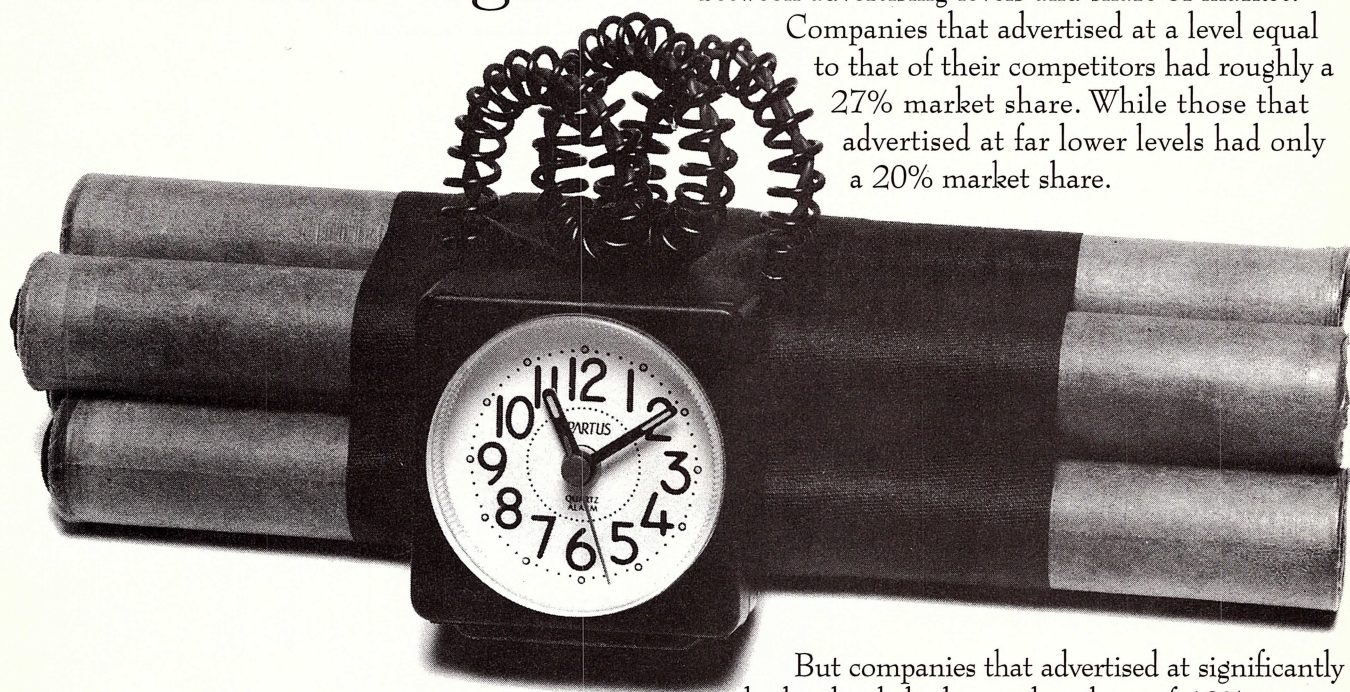


Figure 5: Xit places several handy new buttons on the titlebar.

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ple, command windows might have a button to change the font size or switch the window to full screen—options not appropriate for folders or program windows. Folders, on the other hand, can have unique buttons, such as ones to arrange the icons, sort them alphabetically, or open this folder's parent folder. Program windows might have buttons to copy marked text to the clipboard or paste the clipboard contents into the window. All windows might have a button to get to the LaunchPad, or the X button for which the program was named, which exits (closes) the window.

You will notice that I said the windows *might* have those buttons. That's because Xit is extremely customizable. Xit has 33 predefined functions for buttons, plus the ability to run any command from a button. Figure 6 shows the dialog selecting up to 10 custom buttons and determining on which side of the title bars they will appear. One of my favorite options is the window roll-up function. Clicking on this button causes all of the window, except the title bar, to disappear. This function is similar to minimizing a window to clear up the screen, but it has two advantages. First, the title bar is easier to find than a minimized icon when you want to restore the window. Second, you restore the window with a single click, rather than double-clicking on an icon, or worse, clicking to open a window list just for the privilege of double-clicking on a program name.

Two sets of bitmaps are included for the buttons: one for lower-resolution displays (800x600 or less) and one for higher resolutions. CodeSmith included the bitmaps themselves, so you can also modify those to your own taste with the OS/2 Icon Editor.

Keyboard and mouse redefinition, too

Xit also lets you assign any of the predefined functions or commands of your own to clicks of the middle or right

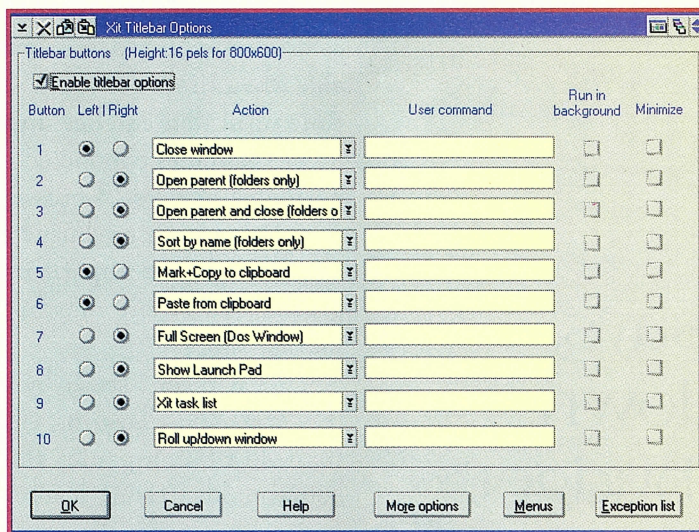


Figure 6: The buttons and their functions are configurable.

mouse buttons—either alone or with the <Shift>, <Ctrl>, or <Alt> keys. Additionally, you can assign any of the functions (but not external commands) to left or right <Ctrl> keys by themselves, or <Alt> plus both of the <Shift> keys.

Two of the predefined functions bring up pop-up menus—either an edit menu or a folder menu, depending on the type of window you are in. You can customize the contents of these pop-up menus, creating menus that contain

just the options most important to you.

Glee or flee

Other than the limitation that the new buttons are not available to Win-OS/2 windows, I couldn't find a downside to this program. It doesn't modify any of your system configuration files, it doesn't affect system performance, and it doesn't use up your screen real estate. Okay, in windows with really long titles, some of the text might be cut off by the new buttons, but that poses little problem. The ability to do so much with

the oft-promised single click seems well worth \$15 to me. **OS/2**

Brian Proffitt was part of IBM's OS/2 team and left IBM to become the director of PC Week's Corporate Labs. He is now the president of Visionary Research, senior contributing editor for OS/2 Magazine, and solutions advisor to PC Magazine. E-mail him at 75300.1466@compuserve.com.

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CompuServe 74601.1327@compuserve.com

CompuServe: GO OS2SHARE, section 1 for support, library 1 to download FM2.ZIP

AOL OS2 library (NOTE: As of this writing, version 2.39 was the most recent available here)

FTP <ftp.cdrom.com/4/os2/diskutil/fm2.zip>

(NOTE: As of this writing, version 2.37 was the most recent available here.)

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Xit 2.1

(Shareware registration: \$15 Canada)

Internet mshill@direct.ca

CompuServe OS2SHARE library 1

AOL, keyword OS2 (Note: only version 1.0 of XIT was on AOL at this writing)

FTP <ftp-os2.cdrom.com>

FTP hobbes.nmsu.edu

WWW http://www.os2bbs.com/david_barnes

WWW <http://www.os2.hammer.org/OS2>

READER SERVICE NO. 123

One of the many minor annoyances in OS/2, as it comes out of the box, is the lack of decent font management. While the Font Palette is adequate for drag-and-drop manipulation, it's next to useless for manipulating system fonts because it's so difficult to use and takes a long time to load new fonts.

Luckily, one OS/2 user, Cliff Cullum, saw this as an opportunity and created a shareware program called FontFolder. Simply put, FontFolder offers some of the dynamic font-loading capability of Symantec's Macintosh program, Suitcase II.

Using PostScript Type 1 typefaces under OS/2 provides two main advantages. First of all, they're the only native fonts that are resizable (the other type of OS/2 fonts are bitmapped, which can only be used at specific point sizes). Second, most available PostScript Type 1 typefaces for OS/2 also include the files used under Win-OS/2, so you can choose your favorite fonts for either your Windows or OS/2 programs.

FontFolder uses the typical shareware installation procedure of unzipping the program into a directory and creating a program object for the executable. When the program is run for the first time, it shows the information that will be put in the .ini file, which will record any customizations that you might make.

FontFolder uses two metaphors to make groups of fonts easier to manage and manipulate. These are libraries and FontPacks.

A library is collection of fonts that can be installed in either the system or FontPack. Most libraries that you'll use will be CD-ROMs, but a library may be any collection of fonts that are available on one or more drives. A number of library definition files are available for most popular OS/2 font CD-ROMs.

Creating your own library is fairly straightforward if you can't find an

existing library to use. One limitation I found was that only one directory can be added at a time. This limitation, which, according to Mr. Cullum, will be fixed in the next release, can make creating a library on a CD-ROM with many subdirectories much more time consuming than it needs to be.

The next type of font groups are called FontPacks, and they allow you to install and remove groups of fonts in one fell swoop. FontPacks are useful for managing groups of fonts that you only need from time to time but don't want installed on your system.

ed, regardless of whether it's installed on the system or in a library. Simply double-click on the font name to get a preview. To get specimen sheets, a wide variety of options are available from the pull-down menu. This addition in the 2.0 version of FontFolder addresses Esther Schindler's only caveat, when she names it one of her favorite utilities in the June 1995 issue of *OS/2 Magazine* ("Esther Utilities 2.0," p.47).

I found FontFolder to be a very stable product that performed every font management function that I could possibly use.

FontFolder is an excellent one-of-a-kind utility for OS/2 users who need to manipulate more than 10 font files. Unfortunately, the dearth of applications that benefit from a large font selection makes this a utility that's probably useful to a small number of users.

FontFolder is nonobtrusive shareware, so you can simply put it on your system today, in case you have a need for it sometime in the future. However, if you do end up using it, then register it and support the shareware concept. It's only through encouraging

ventures like this that OS/2 users can expect to have options when the tools included in OS/2 don't do the job. **OS/2**

(We just received notice that FontFolder 2.1 should be available. New features include the ability to move system font files and view multiple fonts for specimen sheets.)

Alexander Antoniadis is associate editor of *OS/2 Magazine*.

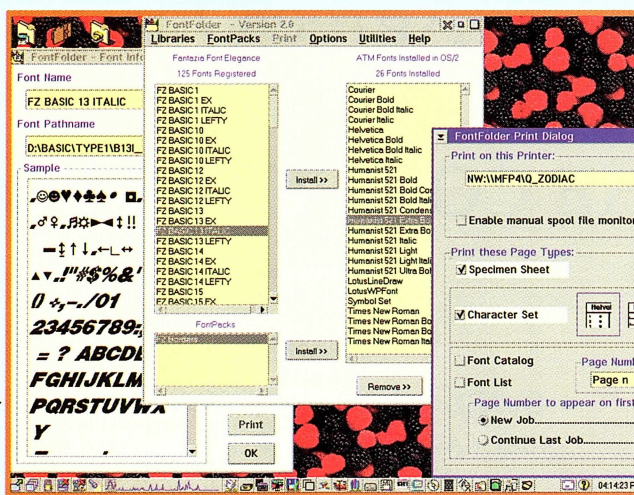


Figure 1: FontFolder's simple and efficient interface.

You don't want too many fonts on your system at one time, because all system fonts are initialized every time you boot OS/2. Therefore, the more fonts you've installed, the longer it will take your system to boot.

With FontFolder, however, fonts can be dynamically loaded and unloaded, either from libraries or FontPacks, without having to reboot. So you can keep your system mean and lean most of the time and still have access to hundreds of fonts as you need them. I found that most programs needed to be restarted to use any fonts added after they'd been launched.

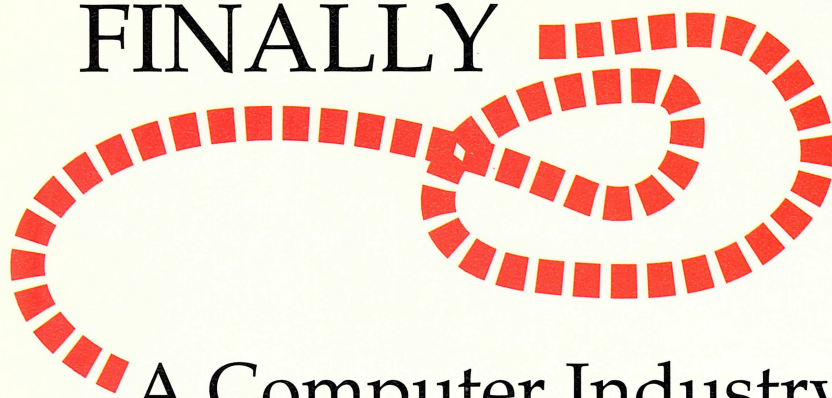
The program's interface is functional and straightforward (Figure 1). Previews and specimen sheets (onscreen and printed samples of what a font looks like) are available for any font list-

Resources:

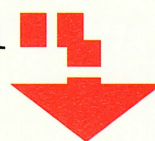
FontFolder 2.0 (\$30 with printing, \$20 without)

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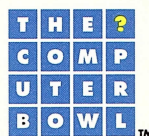
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You Could Actually Learn Something

Have you ever wanted to perform some repetitive task over the Internet but not manually. Well, Innoval Systems has released Surf'nRexx, a REXX-enabled application program interface (API) that allows you to do FTP, mail, news group, and Web site maintenance from within a REXX program. Although the documentation that accompanies Surf'nRexx is sparse, it includes examples that detail each of the functions contained in the API. Table 1 shows the functions included in the API. Also, each of the functions can be used as OS/2 command line utilities. All of the utilities are simple REXX programs. You may use them as is or easily modify them to meet your own requirements. You can enter the commands with or without parameters. If you don't enter parameters, you'll be prompted for input.

If you're familiar with Internet protocols, you can dive right into Surf'nRexx. But if you're not comfortable with them, the best place to start is with the Request For Comments documents. The RFCs can be obtained via an anonymous FTP or from a Web browser from many RFC repositories. The primary repositories will have the RFC available when it is first announced as will many secondary repositories. Many of these repositories also now have World Wide Web servers. Try the following URL as a starting point: <http://www.isi.edu/rfc-editor/>. The Surf'nRexx documentation suggests downloading the Internet RFC documents shown in Table 2 for understanding the protocols and commands for various Internet operations.

You can obtain these RFC documents easily by modifying and running the WEBCOPY utility provided in the Surf'nRexx package. Simply substitute the appropriate RFC number for:

WEBCOPY ds.internic.net/rfc/rfc1725.txt rfc1725.txt

Unfortunately, RFCs numbered below 1,000 are not as easily referenced, and I found that it was necessary to use

Table 1: Functions and utilities included in Surf'nRexx.

FTP	
FTPCOPY	This utility connects to an FTP server and copies a file to your PC.
FTPNEW	This utility will examine the files in a list and send new files to the server.
FTPSEND	This utility is similar to FTPCOPY except that it copies a file to an FTP site.
MAIL	
GETMAIL	This utility gets mail from a POP mail server.
MAILNEW	This utility gets a count of the mail on a POP mail server.
SENDNOTE	With SENDNOTE, you can send a note to an individual E-mail address or to a list of E-mail addresses.
NEWS	
NEWSPOST	This utility posts an article to one or more news groups (USENET).
REUTERS	This utility will build a personal newspaper from the Reuters pages maintained at the Yahoo site.
Web	
WEBCOPY	This utility lets you copy a file from a Web site to your PC. If the file is an HTML file you can also copy image graphics files referenced in the HTML file.
WEBNEW	With WEBNEW, you can monitor a list of Web pages to see if any of the pages have changed. The output is an HTML document that you can retrieve with a Web browser such as the IBM WebExplorer.
WEBCRAWL	WEBCRAWL enables you to crawl from a particular starting page and prepare a report of sites referenced in documents during the crawl. This utility can be very useful for testing linkages from a Web page.

Table 2: RFCs recommended by Innoval.

RFC821	Simple Mail Transfer Protocol by J. Postel.
RFC959	File Transfer Protocol (FTP) by J. Postel and J. Reynolds, ISI.
RFC977	Network News Transfer Protocol by Brian Kantor, U.C. San Diego and Phil Lapsley, U. C. Berkeley.
RFC1036	Standard for Interchange of USENET Messages by M. Horton, AT&T Bell Laboratories and R. Adams, Center for Seismic Studies.
RFC1725	Post Office Protocol 3 by J. Myers, Carnegie Mellon and M. Rose, Dover Beach Consulting Inc.

my WebExplorer and seek them out through the index provided at <http://ds.internic.net/rfc>.

Innoval provides a caution about abusing the powerful capability that Surf'nRexx provides. For example, with the NEWSPOST utility you can easily, quickly, and automatically post articles to news groups. The SENDNOTE utility allows you to send a note to a very large list of people. It should not be abused.

Each of the utilities requires that you manually establish your Internet connection before running the Surf'nRexx utilities. I think that Innoval should have included a call to *link-up.exe* to take care of this matter auto-

matically. Otherwise, Surf'nRexx provides some useful and powerful functions for interfacing with the Internet on a batch basis. **OS/2**

Dick Goran is a contributing editor for OS/2 Magazine. He can be reached via the Internet at dgoran@cfsrex.com.

Resources:

Surf'nRexx (\$39)

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WWW <http://www.aescon.com/innoval/>
READER SERVICE NO. 100

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fact: One out of six attendees at PC EXPO '95 came from companies with more than 10,000 employees. More than one in four were with companies employing over 2,500 people.



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LaunchPad Revisited

BY DICK GORAN

When I began to plan this column, I thought it would be one of the easiest I have done for *OS/2 Magazine*, because I had covered the subject of creating your own LaunchPad exactly 12 issues ago (June 1995, p. 55). My reason for devoting another column to LaunchPad creation and manipulation is quite simple; I still receive e-mail with questions based on that original column. Also, more has become known about the **WPLaunchPad** object, and I wanted to include this new information along with a technique to eliminate the old LaunchPad objects that accumulate in your system every time you create a new LaunchPad, either via REXX or drag and drop. I actually spent more time than anticipated in preparing the material for the column, because I bumped into some Workplace Shell bugs. It turns out that these have been reported in an APARS (IBM-speak for authorized program analysis report).

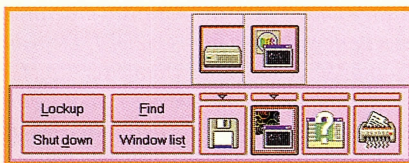


Figure 1: Default LaunchPad.

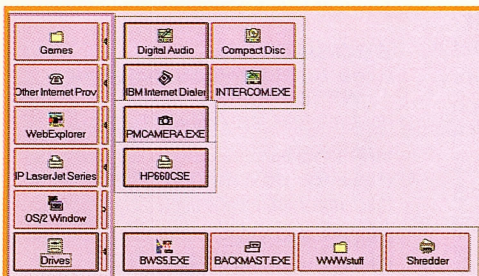


Figure 2: LaunchPad built by 96061s01.cmd.

These APARS (PJ16250, PJ17466, PJ17788, PJ18286, PJ19937) all deal with Workplace Shell hangs when manipulating objects that contain the **NOTVISIBLE=YES** property.

To read a full explanation of the characteristics of the LaunchPad, simply right-click on the border of your LaunchPad, which surrounds the faceplate objects or the drawer buttons, and select **Help**. The faceplate objects are the pushbuttons you see covering the LaunchPad. The drawers are the pushbuttons you see when you open the faceplate subordinate objects by clicking on the button containing an arrow that is adjacent to each faceplate object. There will not be any arrow associated with a faceplate object if no drawer objects are associated with the faceplate.

Each object in the LaunchPad is a shadow of some other object. To add an object to the LaunchPad, simply drag any object and drop it, either on the LaunchPad itself or on one of its drawers. When you want to drop an object between two other objects on the LaunchPad faceplate (the LaunchPad icons that are not in the drawers), a black bar will appear between the two positions when it's all right to release the right mouse button. Similarly, adding an object to a drawer is accomplished by dragging an object to the position on the drawer where you want the new object to appear and then dropping it when the black bar is in the proper position. Because LaunchPad objects are, by definition, shadows, holding **<Ctrl+Shift>** is unnecessary when dragging an object to the LaunchPad, as you would do if you were creating a shadow elsewhere.

You can create any number of LaunchPads via REXX using setup strings to define each LaunchPad's characteristics, faceplate objects, and any drawers attached to each faceplate object. LaunchPad objects belong to the **WPLaunchPad** class. The default **LaunchPad** object has an object ID of **<WP_LAUNCHPAD>**, and shadows of the objects on the LaunchPad normally reside in the **\Nowhere1** directory on your OS/2 boot drive. I have seen systems where the **\Nowhere1** directory has been deleted. In that case, the LaunchPad shadows will be found in the **\Nowhere** directory. Since these shadows are abstract rather than file system objects, you can't simply use a **DIR** command to see what is there. It's necessary to open the abstract object using the **SysOpenObject()** function contained in the **REXXUTIL** Application Program Interface (API). The easiest way to accomplish this action is to launch **REXXTRY** from an OS/2 command line and invoke the **SysOpenObject()** function with:

```
say SysOpenObject
    ( '?:\Nowhere1', 1, 1 )
```

(? represents your boot drive). The **SysOpenObject()** function was introduced with OS/2 Warp. If you are running a prior version of OS/2, you can use the **SysSetObjectData()** function to open the directory. For example:

```
say SysSetObjectData
    ( '?:\Nowhere1',
      'OPEN=DEFAULT;' )
```

will open the icon view of the directory. If the default LaunchPad is deleted, it



Fragment 1: Default LaunchPad properties.

```
/* 9606FG02.TXT - Default LaunchPad properties */
class      = "WPLaunchPad"
title      = "LaunchPad"
location   = "<WP_DESKTOP>"
setup      =,
    "DRAWEROBJECTS=1,";
    "DRAWEROBJECTS=2,<WP_DOSWIN>";
    "FPOBJECTS=,<WP_OS2WIN>,<WP_TUTOR>,<WP_SHRED>";
    "LPACTIONSTYLE=TEXT";
    "LPCLOSEDRAWER=NO";
    "LPDRAWERTEXT=NO";
    "LPFLOAT=NO";
    "LPHIDECTLS=YES";
    "LPSMALLICONS=NO";
    "LPTEXT=NO";
    "LPVERTICAL=NO";
    "TITLE=LaunchPad";
    "OBJECTID=<WP_LAUNCHPAD>";
    ""
call SysCreateObject class, title, location, setup, "R"
```

Fragment 2: Faceplate/Drawer group.

```
f=f+1; faceplate.f = '<WP_OS2WIN>'
d=0
d=d+1; drawer.f.d = '<WP_WINFS>'
d=d+1; drawer.f.d = '<WP_WIN2WIN>'
d=d+1; drawer.f.d = '<WP_DOSFS>'
d=d+1; drawer.f.d = '<WP_DOSWIN>'
d=d+1; drawer.f.d = '<WP_OS2FS>'
    drawer.f.0 = d
```

can be recreated by double-clicking anywhere on the Desktop. Figure 1 shows the layout of the default LaunchPad, and Fragment 1 shows the settings that are used to create this default LaunchPad. If you want to create more than one LaunchPad, each must have a unique object ID, one of which should be the default of <WP_LAUNCHPAD>.

I have created a new program, which is available via anonymous FTP, *9606ls01.cmd*, that adds the improvements to last year's LaunchPad program. Figure 2 shows the LaunchPad that was created using *9606ls01.cmd* on one of my systems. You can easily modify this program to contain your own faceplate and drawer objects to build a customized LaunchPad. Each faceplate and drawer group is defined so that only the object names (either object ID or full file system name) need be changed. Fragment 2 shows the lines used to create a faceplate with an OS/2-windowed session

and drawers containing an OS/2 full-screen session, DOS-windowed and full-screen sessions, and WIN-OS/2 windowed and full-screen sessions.

When you're creating a new LaunchPad, you'll need to clean out unused or dead shadows. Why? When a new LaunchPad is created, all of the old shadows

remain in the \Nowhere1 directory until they are explicitly deleted. If you have had occasion to recreate your LaunchPad, either the default configuration or a customized version, you have many dead shadows in your \Nowhere1 directory. You can see these unused shadows by opening \Nowhere1. No way exists to determine which of these shadows are active and which can be removed. If you inadvertently delete an active shadow, the corresponding object will disappear from your LaunchPad. The WPTools API provides the **WPToolsFolderContent()** function that will allow you to enumerate the contents of a folder object or directory. Each of these objects can be checked to see if it is a shadow and, if so, delete it. I'm not aware of any other OS/2 application that creates shadows in this directory, so no harm should come from deleting all of the shadows you find. If you find objects that are not shadows, leave them alone.

One program that creates objects in \Nowhere1 is DeskMan/2 from Development Technologies.

You will also find numerous objects with a title of **Find** in the icon view of \Nowhere1. These are **WPFilter** objects that are created by the OS/2 Find facility. Unfortunately, **WPTools** does not include these in the list of objects it returns; therefore, these dead objects have to be manually dragged to your shredder to eliminate them.

If the \Nowhere1 directory is deleted, you will lose your .inf file association to the *view.exe* program, which results from the loss of one of OS/2's mystery objects, <WP_VIEWINF>. The <WP_VIEWINF> object is built by OS/2 Install to associate .inf files with the **VIEW** program. I can't understand why this technique was used, because it would have been easier simply to create an association for *view.exe* specifying *.inf as the file association. Be that as it may, because <WP_VIEWINF> is built with **NOTVISIBLE=YES**, changing it can result in the problems described in the APARS listed at the beginning of this column.

Another problem occurs when trying to add additional faceplate objects to an existing LaunchPad (PJ17466). If you want to add an additional faceplate with a REXX program, you need to recreate the LaunchPad by first creating the faceplates and then adding the drawer objects. **OS/2**

Dick Goran is the author of the REXX Reference Summary Handbook, an OS/2 reference. He was in the IBM mainframe systems software development business until 1987. Dick's free REXX utility programs can be downloaded from OS2DF1, Lib 6 on CompuServe or FTPed from ftp://ftp.cfs-rexx.com/pub. He can be reached at CompuServe 71154,2002 or at Internet at dgoran@cfsrexx.com.

Resources:

9606ls01.zip
(free for download includes WPTools DLL)
<ftp://ftp.cfsrexx.com/pub/9606ls01.zip>

WPTools
(free for download)
<ftp://ftp.cfsrexx.com/pub/wptool18.zip>

OS/2 APARS
(free for download)
<ftp://hobbes.nmsu.edu/~os2/info/30apr1.zip>

Intensive Care for Your Domain

BY WAYNE RASH, JR.

No matter how you look at it, trying to make major changes to the structure of your LAN Server domains is more difficult than it should be. Want to merge a few domains into a single larger domain? Maybe you need to divide a domain into a couple that are smaller. In fact, with the tools that IBM gives you, it's darn near impossible.

Whatever it is that you want to do, the chances are pretty good that you can't do it with anything short of major surgery. Making matters worse is the fact that you know that it doesn't need to be this hard. If you were running another operating system, perhaps Novell NetWare 4.1 or Banyan VINES 6.0, you'd be able to manage the equivalent structures easily. With LAN Server domains, some things just aren't so easy.

Worse, as an administrator, you can spend hours making sure that your users are all set up according to the standards you've set. For example, how do you know that, even though limits on disk space or password length are in the template you use for adding users, those users are actually set up the way they're supposed to be? Well, you *could* look at each user's settings book and make sure. But suppose you have a lot of users?

Missing tools

If you've used Novell's latest version of NetWare, you know the ease with which you can change the directory structure in that network operating system. Combining trees requires only a mouse click or two. Pruning or dividing those trees is just as easy.

While the NetWare directory trees

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aren't exactly the same thing as LAN Server domains—they're quite a bit more advanced in their concept, for one thing—the analogy fits. Making such basic changes with LAN Server can be nearly impossible, but it shouldn't be. As a result, running an OS/2 networking environment is unnecessarily difficult.

Fortunately, although IBM didn't give you the tools you need to perform surgery on your network, there are ways to get control over your domain. One of the most effective is the LAN Intensive Care Utilities from Lieberman and Associates. This collection of LAN administration tools adds some of the most important capabilities that IBM forgot. In addition, the LAN ICU collection also takes care of problems that IBM created in the first place.

A look at LAN ICU

This utilities package is designed to provide its best support in large environments. After all, if you only have 10 users, checking everything manually isn't very hard. On the other hand, suppose you had to administer a LAN with 5,000 users? Suppose you had to confirm that each one was set to the right password policy, the right maximum file size setting, or the hours during the day that each user could log on? You'd never be able to do it.

The idea behind the LAN ICU is to do those tasks for a network administrator that would take vastly more time, be significantly more difficult, or that might be simply impossible to accomplish any other way. LAN ICU uses four basic tools that run through the domain and collect information and then change settings where they need to be changed.

One thing you have to get used to early on though, is the fact that Lieberman and Associates has spent its time in functionality, not looks. The LAN ICU isn't pretty, but it does work. In other words, most LAN ICU functions take place at the OS/2 command line, through commands you type, followed by arguments that you also type.

LAN ICU is organized around four modules. These modules are designed to perform specific functions, including gathering and distributing data, performing analyses of the domain, and automating changes to the domain. You can use these separate utilities together or separately, and the result can be powerful.

The first utility you'll probably use



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is the Exporter, which you invoke by typing "LU", followed by a series of arguments. These arguments let you collect specific types of information about the domain, including information about users, servers, and so on. Not using an argument collects all available information about the domain. LU produces an ASCII file that can be used to rebuild the domain.

Closely related is the Batch Editor, which uses modified files from the Exporter to update or replace items in the domain. You can use the Batch Editor to add or update user accounts and domain resources by using a text editor to make changes to the file created by LU, and then running the Batch Editor against it, followed by appropriate arguments. You can edit the whole domain in this way, and if you used the Exporter against an external domain, you can use the Batch Editor against that as well.

The Analyzer is designed to verify user accounts and resources in the domain. This part of LAN ICU is interactive, so as it goes through the domain user accounts and the resources, it will ask you if you want to make changes in those cases where the item differs from the system defaults. You can also set the Analyzer so that it works without user input.

The final utility is the Domain Definition Report Converter, which is designed to produce a file for the Batch Editor from the Domain Definition Report created by LAN Requester in LAN Server 1 or 2. You'd use this conversion file if you were updating to Warp Server, for example.

Power tools

While we'd like to have seen tools that were a bit more approachable in terms of their user interface, our talks with Lieberman and Associates reveal that the company, when faced with a choice between a graphical user interface and functionality, chose the latter.

It's hard to argue with that, especially because this is a tool aimed at professional administrators of large networks who shouldn't be intimidated by having to type in their own commands.

In any case, one graphical tool called the ICU Database can be used

with this suite. This product has a graphical user interface that can be used to extract information about your domain and present it in a database file format.

You can choose between comma-delimited text and a standard dBASE IV file format. Lieberman has placed this file on its Web site.

If you are responsible for managing a large LAN Server domain, this set of tools is probably indispensable. Even though it is fairly pricy, I suspect you could pay for it almost immediately in productivity gains, simply because your LAN administrator won't be spending all day buried in repetitive tasks, such as verifying user accounts.

Last hurrah

This is my last column for *OS/2 Magazine*. My other writing commitments, primarily my new book, *Politics on the Nets*, to be published by W.H. Freeman/Scientific American Press in January, require me to curtail some other activities, and unfortunately, this is one of them. It's been good writing to you over the past months, and I'll be sorry to be moving out of these pages. Thanks for reading. **OS/2**

Wayne Rash, Jr. is a contributing editor and columnist for Communications Week. He's based in Washington D.C. and edits technology sections for The Washington Post. He can be reached at CompuServe 72205,221 or Internet wrash@interamp.com.

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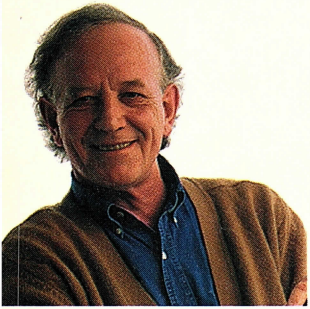
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Reader Service No. 35





Brush Up Your C++

BY STAN KELLY-BOOTLE

My regular readers, if such there be, will know of my interest in the computer book titling process. Previous columns have discussed the challenges facing publishers as their catalogs continue to grow. A good title should not only indicate the contents as pithily as possible, it must also serve to differentiate the book from its otherwise indistinguishable rivals. Certain templates have emerged, such as *X for Dummies* (of which series, *Bob for Dummies* has been the only failure); *Mastering X*; *X Unleashed*; *Zen and the Art of X*; and *X for Y Programmers* (where *X* and *Y* are possibly related languages). New Riders Publishing has even tried the parsimonious *X!* Publishers jealously guard a successful template and are ever ready to exert their legal *avoir du pois* to discourage plagiarism. A new template devised by Jeff Duntemann, founder and publisher of Coriolis Group Books, is outrageous enough to escape imitating, but it might incur the wrath of the recently empowered Internet censors. Duntemann has two titles lined up: *Kick-Ass Java* and *Kick-Ass Delphi*. If this irreverent play catches on, we might see *Kick-Ass Assembly*, or the book that OS/2 users would surely buy, *Kick-Ass Windows* by Howard Stern.

Most of the OS/2 programming books I've reviewed so far have assumed a prior knowledge of C++. Several readers have asked me to suggest some books that might help them get started in C++, some from scratch, some from a background in C. With the unrelenting stream of C/C++ material available, it's not easy to make suggestions without knowing your present skills and future goals. Also, the titling

Cynics have suggested that more books on C/C++ are available than extant lines of code written in those languages.

problem is especially acute. Cynics have suggested that more books on C/C++ are available than extant lines of code written in those languages. The resulting advantage is that if you are puzzled by a line of C/C++ code, there's probably a book devoted to explaining it. (Alas, I know of no mapping from code line to book title!)

However, the two foundational, must-have "bibles" stand apart: *The C Programming Language* by Brian W. Kernighan & Dennis M. Ritchie (Prentice-Hall—make sure you get the latest edition, ISBN: 0-13-110163-3), simply known as K&R, and *The Annotated C++ Reference Manual* by Margaret A. Ellis & Bjarne Stroustrup (Addison-Wesley, 1990 ISBN: 0-201-51459-1), referred to as ARM. K&R is more of a readable tuto-

rial than a formal language reference; ARM is quite the reverse. While you are learning the basics, you'll find our sibling *C/C++ Users Journal* a useful resource. If you buy a Borland C++ compiler, you'll acquire some excellent tutorial code samples and documentation (especially the bits I wrote).

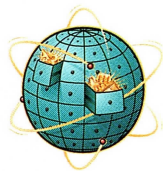
Now with C++, there's an added complexity for the learner. Unlike C, which has a firm ANSI specification, several recent C++ extensions and a new STL (Standard Template Library) are not quite frozen as I write. Two highly recommended books, just out from Addison-Wesley, cover these new features: *STL Tutorial and Reference: C++ Programming with the Standard Template Library* by David R. Musser & Atul Saini (ISBN: 0-201-63398-1) and *More Effective C++—35 New Ways to Improve Your Programs and Designs* by Scott Meyers (ISBN: 0-201-63371-X). The latter is a sequel to Scott's best-selling *Effective C++—50 Specific Ways to Improve Your Programs and Designs* (ISBN: 0-201-56364-9), published in 1992.

Now there's effective titling for you, not to mention the amplifying essay masquerading as a subtitle. The challenge is what to call future volumes in the series. Meyers's third edition could be *Even More Effective C++*, but what follows? **OS/2**

Stan Kelly-Bootle started computing on EDSAC I at Cambridge over 40 years ago. His latest book is The Computer Contradictionary (1995, MIT Press). His next book will be The OpenDoc Primer (Sigs). He welcomes e-mail via CompuServe 70323,1560 or Internet skb@crl.com. Try his Web page: <http://www.crl.com/~skb>.

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